"H E A D A C H E"

A STUDY OF PAIN

BY

R. M. S. McCONAGHEY

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H E A D A C H E.

A STUDY OF PAIN.

1.

The study of pain in all its aspects, has been stimulated and greatly facilitated by the work of Lewis and his colleagues; (Lewis 1942). A vast, and to a great extent, unexplored field for Clinical Research has been opened up. This paper is based upon the investigation of a single common symptom; that of headache. The term has been interpreted in the sense applied by Pickering (1939); that is, pain felt in the region of the cranial vault. This definition is important, as the term headache is often used by patients to indicate many minor sensations of discomfort and defects of cerebration associated with an inability to think clearly, in no way connected with the sensation of pain.

Headache is one of the commonest single symptoms ascribed to disease. There are indexed, fiftyeight separate entries against it in Price's Practice of Medicine, (Price 1942) and seventyfour in the British Encyclopaedia of Medicine (Rolleston 1940). Most of these, however, when analysed, fall under the headings of either fever and toxaemia, or cerebral disease, or alteration in cerebral pressure. Headache is also one of the

commonest types of pain for the relief of which, the advice of the General Practitioner is sought, and it is only the General Practitioner who is in a position to assess the relevant frequency of the various types of head pain encountered. It is from him that those cases, which prove intractable or difficult of diagnosis, pass to the general surgeon or physician, to the neurologist, opthalmologist, psychotherapist or psychiatrist. Each special practitioner is apt to lay stress upon the importance of the type of headache with which he has to deal. There is, therefore, much misapprehension as to the incidence and relative importance of the various clinical types. There is, moreover, a tendency to invoke "personal idiosyncrasy" and "psychiatric trends" to an unwarrantable degree. Symonds (1937) writes:-

> "headache not uncommonly occurs in many persons without "any very important cause. Some suffer readily from "headaches, for instance, as a result of stuffy or "thundery atmosphere, worry, fatigue, indigestion, "insufficient sleep or a slight infection or intoxication."

Jefferson (1944), in discussing traumatic headaches, states that:-

> "there is no doubt that a very high proportion of post- "traumatic headaches are neurotic, that they occur "especially in people inclined by nature to have headaches, "and unless handled with an understanding firmness, the

"lead to degeneration and loss of morale."

To dismiss the complaint of headache because it has no very important cause, is surely an admission that the cause has either not been found, or has not been appreciated, and to ascribe the cause to an inclination on the part of nature is not only unjust, but discourteous. The writer has been considerably impressed by this vague, indefinite and indeterminate approach, and is convinced that a proper understanding of the subject can only come when the nechanism of head pain is more generally understood and the relative frequency of the various syndromes properly investigated.

Far too often does the sufferer return from a visit to his Medical Adviser with a prescription for aspirin or a letter to take to an Oculist, and that without the satisfaction of having had his head, the part in which he complains of the pain, even looked at; his pulse may have been taken, his heart sounded, his blood pressure perhaps estimated, and, if his Doctor is interested in psychiatry, searching questions into his intimate and private life may have been made. This picture is by no means an exaggeration. Life-long sufferers from headache frequently remark that no previous Practitioner has ever touched their heads. One indeed, had had ventriculograms taken in a reputable Neurosurgical Clinic, without the structures external to the cranial vault having

been examined in any way.

The frequency with which the symptom is met may account for its relative neglect. A symptom so universal is of little use as an aid to diagnosis. Yet, headache is often the sole complaint. When this happens, signs of disease are diligently sought in other parts of the body and if found, are promptly indicted as the cause of the headache, without any enquiry as to how the particular disease can activate pain in the head. Neglect of the symptom in the past may be attributed to the delicacy of our Victorian forebears. All readers of the novels of that paradoxical period of corporal compression and colonial expansion, will doubtless have been impressed by the frequent mention of headache and syncope, used as thinly disguised feints for the protection of female modesty. Headaches, indeed, can seldom in those days have been taken seriously.

The material on which this thesis is based consists of a consecutive series of cases of headache met with in general practice. First a series of one hundred cases of all types was taken and the relative incidence of the various causes were assessed. This part of the investigation extended over the six months, April to October. The series was then enlarged to obtain one hundred cases of fibrositic headache and the various manifestations of this condition were analysed.

While it is admitted that the series under consideration is small and that the usefulness of the figures obtained are, on that account vitiated, it is felt that a larger series would take sometime to gather in a stationary population and that statistically, figures extending over several years would not carry the same significance. The real value of the investigation can only be assessed by comparison with similar studies by Practitioners in other parts of the Country.

THE ANATOMICAL AND PHYSIOLOGICAL BASIS OF HEADACHE.

Pain in the head may arise (1) from structures within the skull, (2) from the skull itself, or (3) from structures external to the skull.

It is difficult to conceive of any pain in the head being caused by anatomical or physiological changes in any other part of the body, unless these directly affect the pain producing structures in the region of the head and neck.

Psychiatric disease and in particular hysteria, may give rise to pain in the head. In these cases the pain is no different to the pain experienced in other parts of the body from similar causes, and obeys the same laws.

1. Pain sensitive structures within the skull.

It has been generally recognised, that the dura mater, the pia mater and the cortex are insensitive, (Lewis 1942). Cushing (1911) believed the falx and tentorium, to be pain sensitive and Mc Naughton (1939), showed that where an intracranial tumour or blood-clot or abscess or brain oedema exerted pressure on the falx or tentorium, pain occurred in areas consistant with the nerve supply.

Northfield (1938), demonstrated (what had already been recognised), that brain tumours do not always cause pain and that when they do, the pain is related to distention of the intra-cranial

structures. Northfield thought that headache in tumours was a type of visceral pain caused chiefly by changes in tension within the vessels; it was dull, heavy and diffuse. Dural pain, pain produced by a tumour adherent to the dura, was rarer and resembled somatic pain, in being sharper and more localised. The work of Lewis on somatic and visceral pain mentioned below, casts grave doubts on the truth of this observation.

The innervation of the dura was studied by Penfield (1935). The chief supply is from the trigeminal nerve and especially its opthalmic division. There are twigs also from the 9th, 10th and 12th cranial nerves. Destruction of the opthalmic division of the trigeminal nerve has been shown to eliminate headache on the side treated, (Pickering 1933-34(a); Harris 1946).

Pain sensitive tissues within the skull are probably limited to the region of the falx and tentorium and possibly connected with the larger arteries in that area. The pain path is chiefly through the opthalmic division of the trigeminal nerve. Pain of intracranial origin is thus limited to a few special structures, and it is permissible to draw the inference that intracranial pain is rare. Headache is associated with those diseases which cause increased intracranial pressure; with renal disease, hyperpiesia and tumour. Headache in renal disease is not common but occurs in uraemic crises. These have been investigated by Pickering

(1933-34(b)), who demonstrated in three patients, that during the attacks of headache, the cerebrospinal pressure remained unaltered, and came to the conclusion that:-

"while there was no evidence that headache in these cases "was due to raised intracranial pressure, yet it is probable "that the pain was due to some form of mechanical change in "the cranial cavity, for in all three patients, pain was "immediately increased by withdrawal of cerebrospinal fluid."

In hyperpiesia, headache is quite frequently complained of but often when the patient is pressed, he confesses that there is no real ache or pain, but merely a confused or muddly sensation - an inability to think clearly. There is no doubt that in the popular mind, headache and high blood pressure are closely associated. A patient will often present himself, complaining bluntly of "blood pressure", and will only on careful questioning modify his complaint to headache. Hyperpiesia is frequently absent in these cases. Conversely, hyperpiesia appears usually to remain latent for years before either it is discovered in the course of a routine examination, or it becomes manifest as a cause of cardiac or renal failure.

Cerebral tumour may remain painless for long periods, in spite of considerable intracranial pressure and distortion of the cerebral contents.

Pickering (1933-34(a)), has deminstrated that the surest method of inciting headache, is by a sudden lowering of the intracranial pressure. He showed that an intra-venus injection of histamine, caused a drop in the blood pressure and an increase in the cerebro-spinal pressure, both occuring for a period of less than a minute. The cerebro-spinal pressure then dropped and coincidentally, the subject complained of a headache which came on rapidly to reach its maximum in thirty seconds and remained maximal for a further minute before fading, finally to disappear in six to ten minutes after the injection. The conclusion reached by Pickering was that the pain may be due to stretching of a sensitive structure lying close to the meningeal arteries. Such stretching he thought, might be due to swelling of the perivascular tissues or to widening of the arteries.

Histamine headache is described in normal subjects as affecting both sides of the head equally.

"It usually begins in the forehead, often just above the "orbits, occasionally in the temples, and while remaining "maximal there, invades the vertex and occasionally the "occipital region as it increases in severity. As the "ache lessens, the area involved retracts until finally, "it is restricted to that initially affected. The pain "is a little dull in character, hard to localise precisely, "and is felt deep in the head. Nausea is unusual, but

"may be experienced when the headache is severe; vomiting "has occurred only twice in over two hundred observations. "Bright spots in front of the eyes have been described by "Best and McHenry (1931), but have not been experienced by "any of the subjects examined by us."

Pickering remarks on the similarity between the histamine headache artificially induced and the "mild headache of the type common in normal people and of uncertain cause." These headaches were usually frontal, sometimes throbbing, aggravated by shaking the head, relieved by jugular compression and temporarily abolished by the injection of histamine. He suggested that the mechanism of these headaches may be identical with those of the histamine headache.

In 1939, Pickering reviewed the state of our knowledge with regard to the subject. He pointed out that lumbar puncture headaches were associated with a low cerebrospinal pressure and that it was relieved by raising the pressure by the intra-thecal injection of saline. He put forward the suggestion that this was due to a widening of the intracranial arteries, owing to the fall in the pressure outside these vessels. He mentioned the alternative possibility, that the pain might arise from distortion of the dura in the neighbourhood of the large venous sinuses or by a backward or downward displacement of the brain, but this he

considered to be unlikely. (Pickering 1939). Pickering thought that the headaches of pyrexia were due to the same mechanism, but his conclusions were based on the observations of only a few cases.

2. Pain in the skull itself.

The writer has no personal experience of pain originating from this structure, with the exception of sinus pain, nor has he seen any literature referring to the experimental induction of pain in this area. Its nature and paths of reference should be similar to that of pain from the deeper fasical and muscular structures described below.

3. Pain from structures external to the skull.

The sensation of superficial or skin pain, is precisely localised around the point stimulated.

Deep pain, on the other hand, is referred distally from the point stimulated along the ontogenetic segments concerned. (Kellgren 1938). The areas of pain reference for the body from the lower cervical region to the sacrum were mapped out by Kellgren (1940), who, using pain producing stimuli in human subjects, demonstrated that pain areas from deep pain, although closely resembling the dermatomes of the head were not identical.

Kellgren (1938), showed that injections of 0.1 cc of 6% saline into the occipital triangle gave pain felt deeply in the head which was described as "headache", and that saline injected

into the occipitalis muscle or the facial muscles in the region of the canine fossa might give rise to "earache".

The work of Kellgren was repeated by V.T. Inman and J.B. de C.M. Saunders (1944). These investigators list five characteristic qualities inherent in deep pain.

(1) The character of the pain which radiated from the site of the experimental lesion is similar to that elicited at the point of stimulation, excepting that it tends to appear somewhat later and at a varying interval of time after the infliction of the local lesion. The interval varies from a few minutes to a matter of hours.

(2) The second characteristic is the continuity of pain from the local site along the path of its proximal or distal radiation.

(3) Stimulation of the same anatomical structure, whether it be periostium, ligament or fascia etc., always results in radiation along the same path and in the same direction.

(4) The extent of the radiation varies with the intensity of the stimulus; the greater the stimulus, the more extensive the radiation.

(5) Pain may radiate either proximally or distally from the point of stimulation, and on occasions may persist

with exacerbations for several days, even when the experimental trauma is small.

They designate the areas mapped out by them as sclerotomes.

Cyriax in 1938, was the first to apply the methods of Kellgren to the study of headache. By injecting 0.1cc of a 4% solution of salt at various points in the occipital, temporal and upper parts of the posterior and lateral cervical muscles and into the epicranial aponeurosis he was able to map out the reference to pain from the various sites stimulated. His findings are illustrated in the diagrams below:-

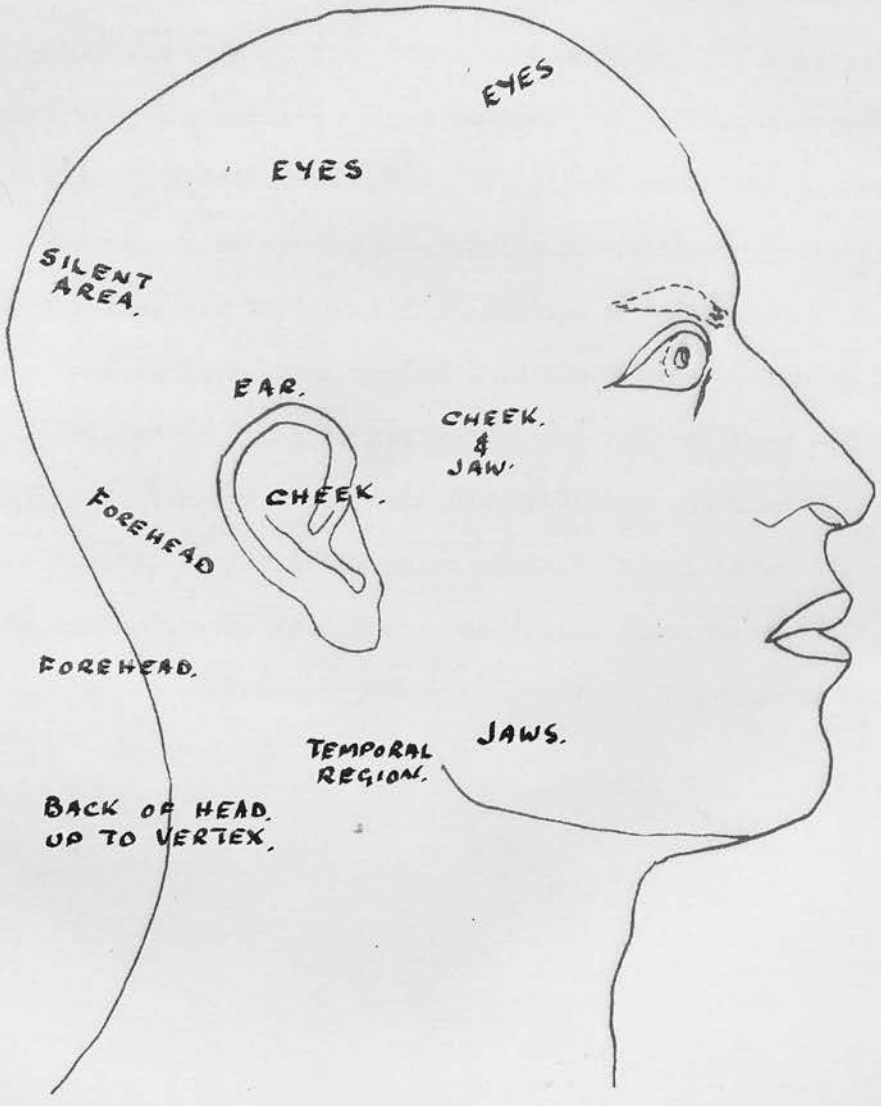


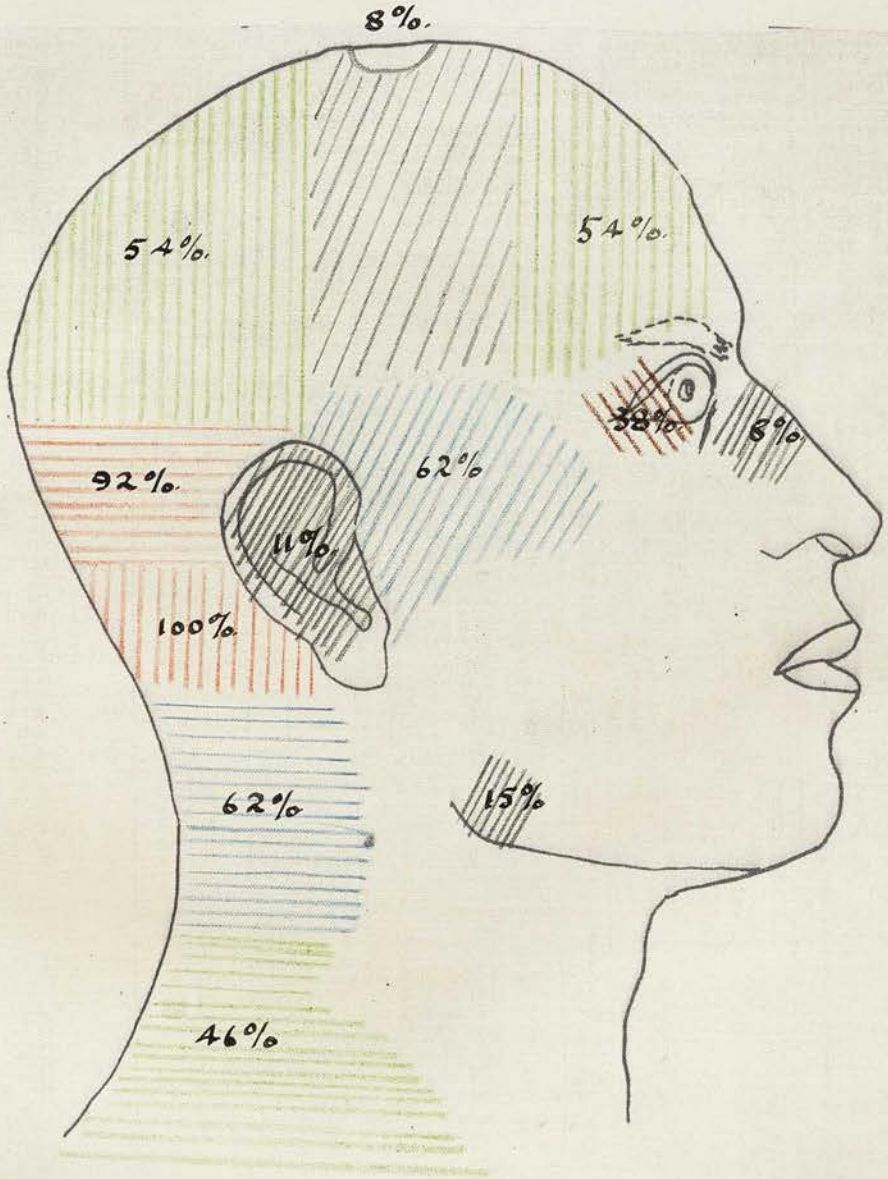
Diagram showing the areas of origin of pains referred about the head and neck. (Cyriax 1938 B.M.S. II.1367)

Cyriax failed to state the number of experiments performed and therefore the value of his observations is vitiated.

Campbell and Parsons (1944), repeated Cyriax experiments in a systematic manner, investigating the sources of head pain by scratching the periostium and periarticular structures with a needle and by injecting capsules, facial and muscular structures, with a few minims of 6% sodium chloride in sterile solution. Each of the cervical and basi-occipital somites were investigated in turn. They further supplemented this finding by searching for painful nodules or "trigger points" in the neck by deep palpation and injecting these with procain hydrochloride solution. The site or irritation and the tempore-spatial distribution of pain and its concomitants, (giddiness, autonomic disturbance, etc.,) were charted on diagrams. These diagrams are reproduced below:-

The distribution of pain referred from the occipit-cervical region. Space C.1.

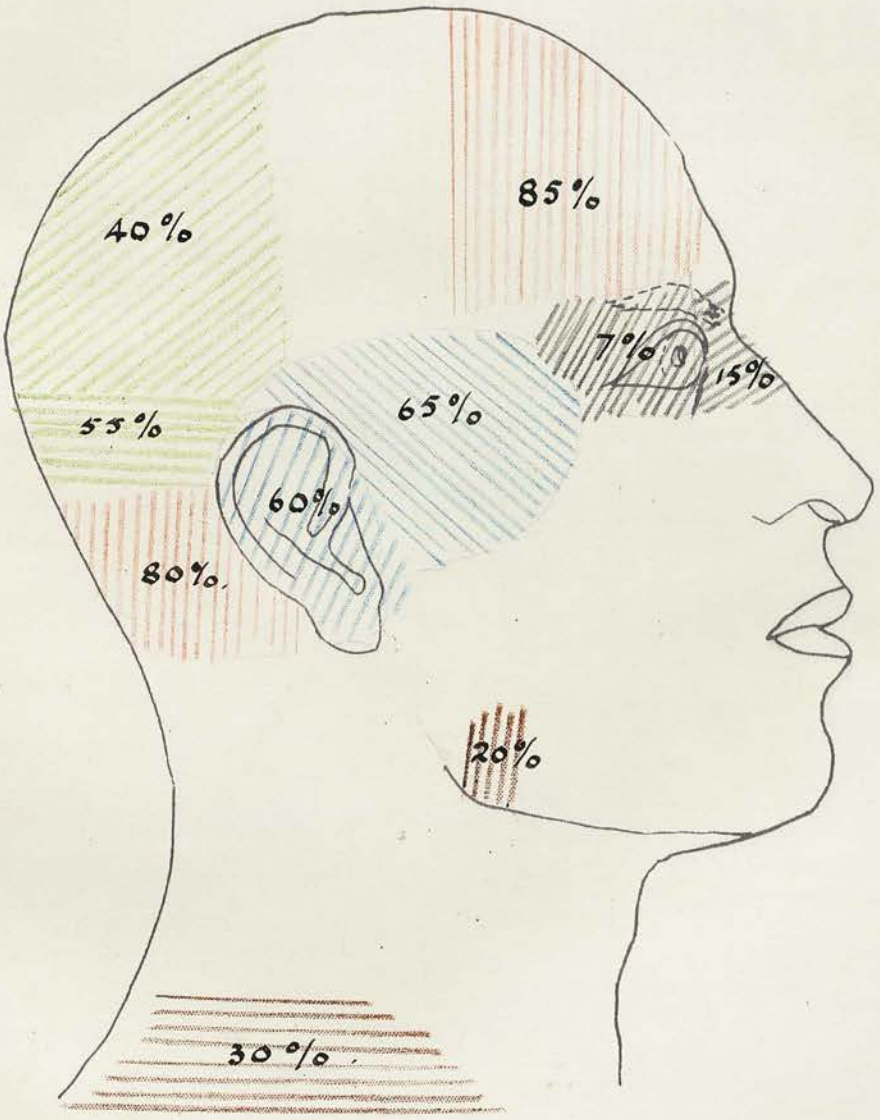
80%	-	100%	Red
60%	-	79%	Blue
40%	-	59%	Green
20%	-	39%	Brown
0%	-	19%	Black



27 experiments on 13 cases.
Disturbance of equilibrium 82%
" " autonomic system 82%

The distribution of pains referred from the baso-occipital region.

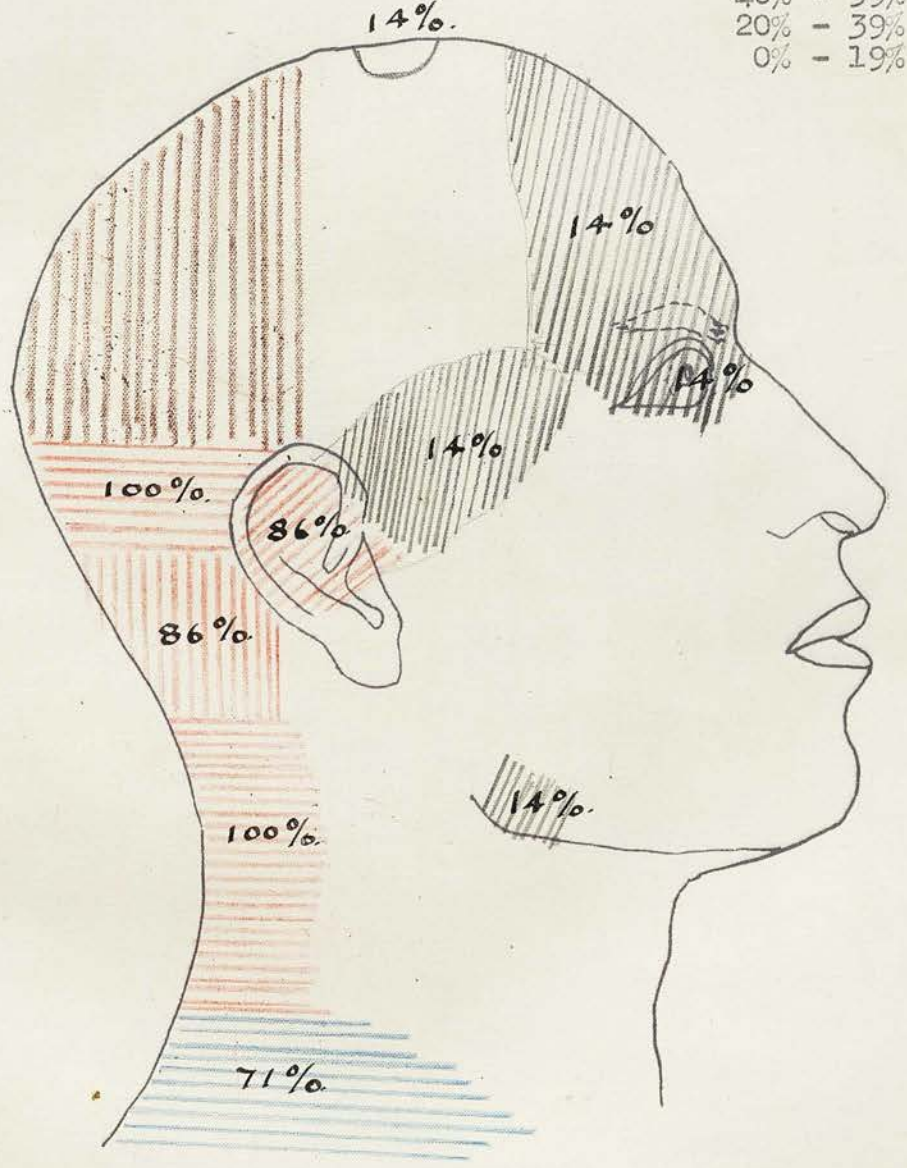
80%	- 100%	Red
60%	- 89%	Blue
40%	- 59%	Green
20%	- 39%	Brown
0%	- 19%	Black



44 experiments on 20 cases.
Disturbance of equilibrium - 85%
" " autonomic system - 90%

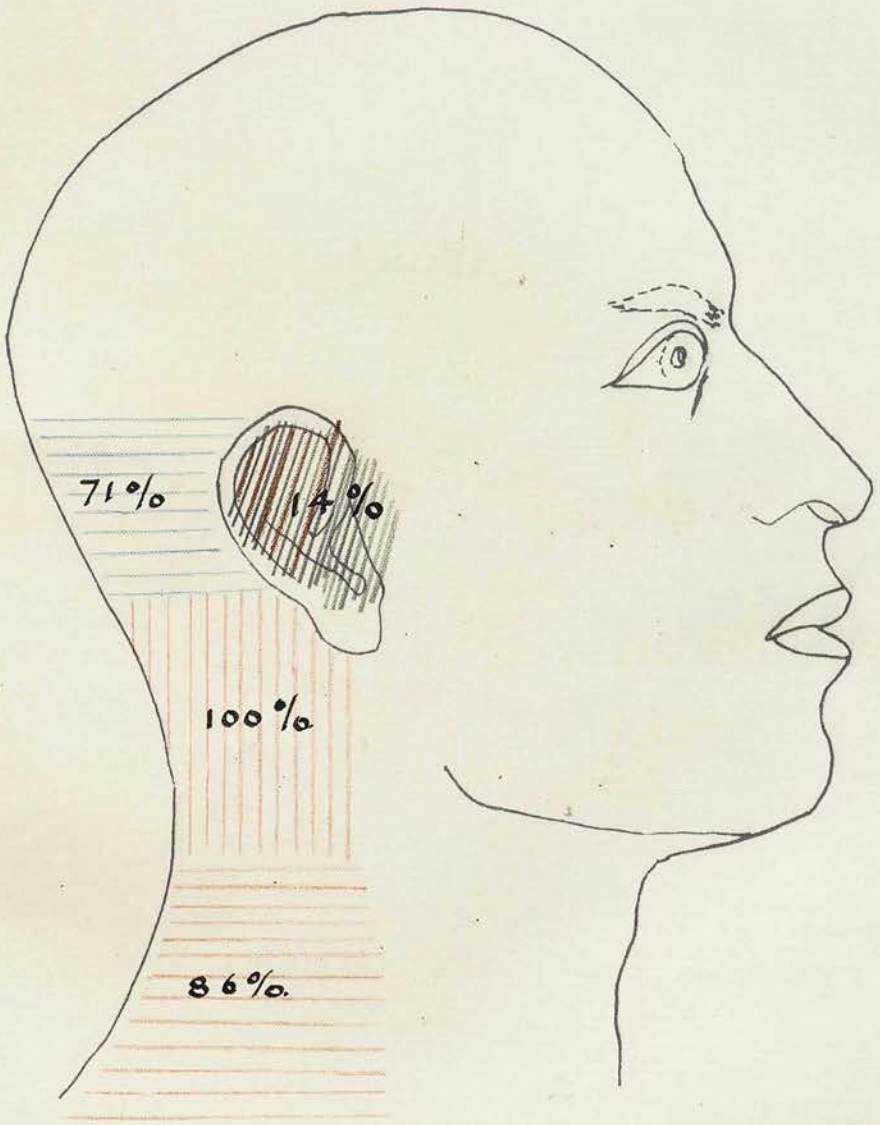
The distribution of pains referred from the interspace C 2.

80% - 100% Red
60% - 79% Blue
40% - 59%
20% - 39% Brown
0% - 19% Black



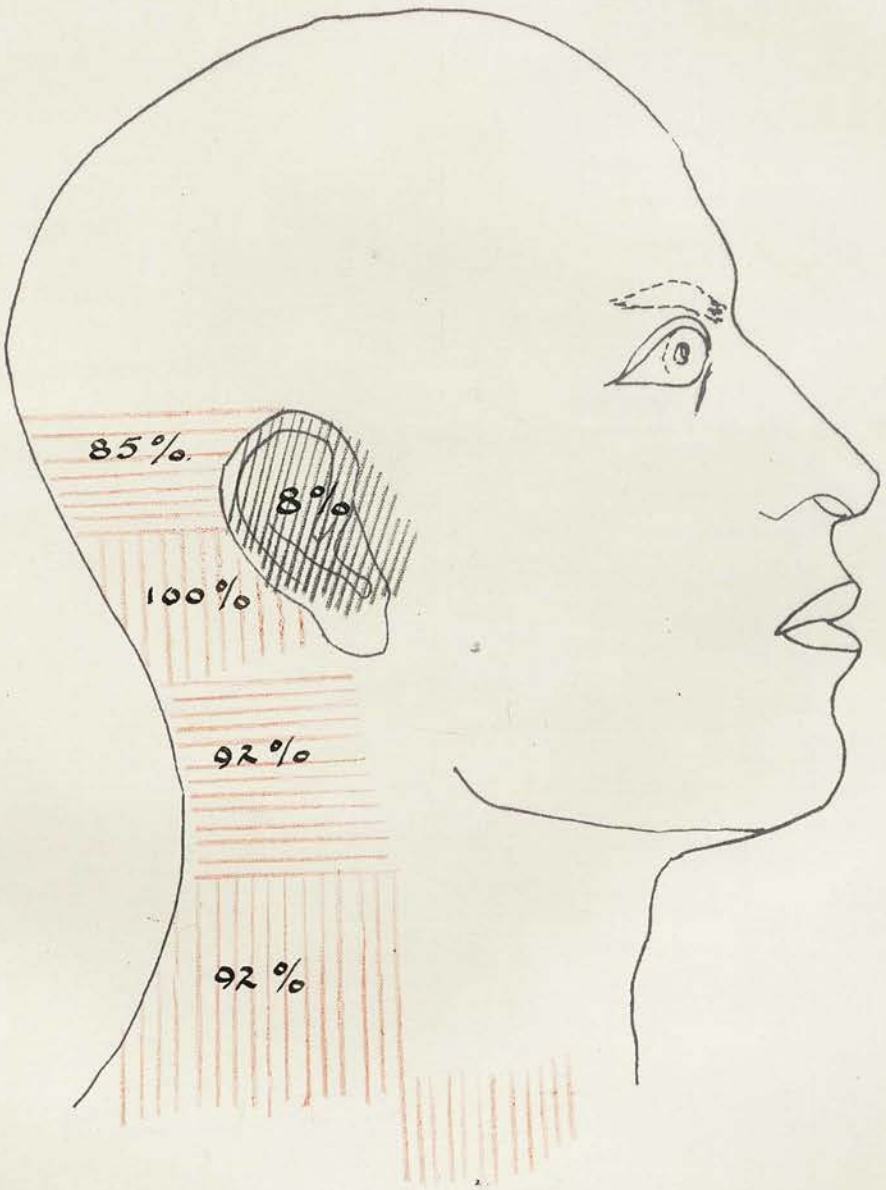
10 experiments on 7 cases
Disturbance of equilibrium - 85%
" " autonomic system - 85%

The distribution of pain referred from the interspace C. 3.



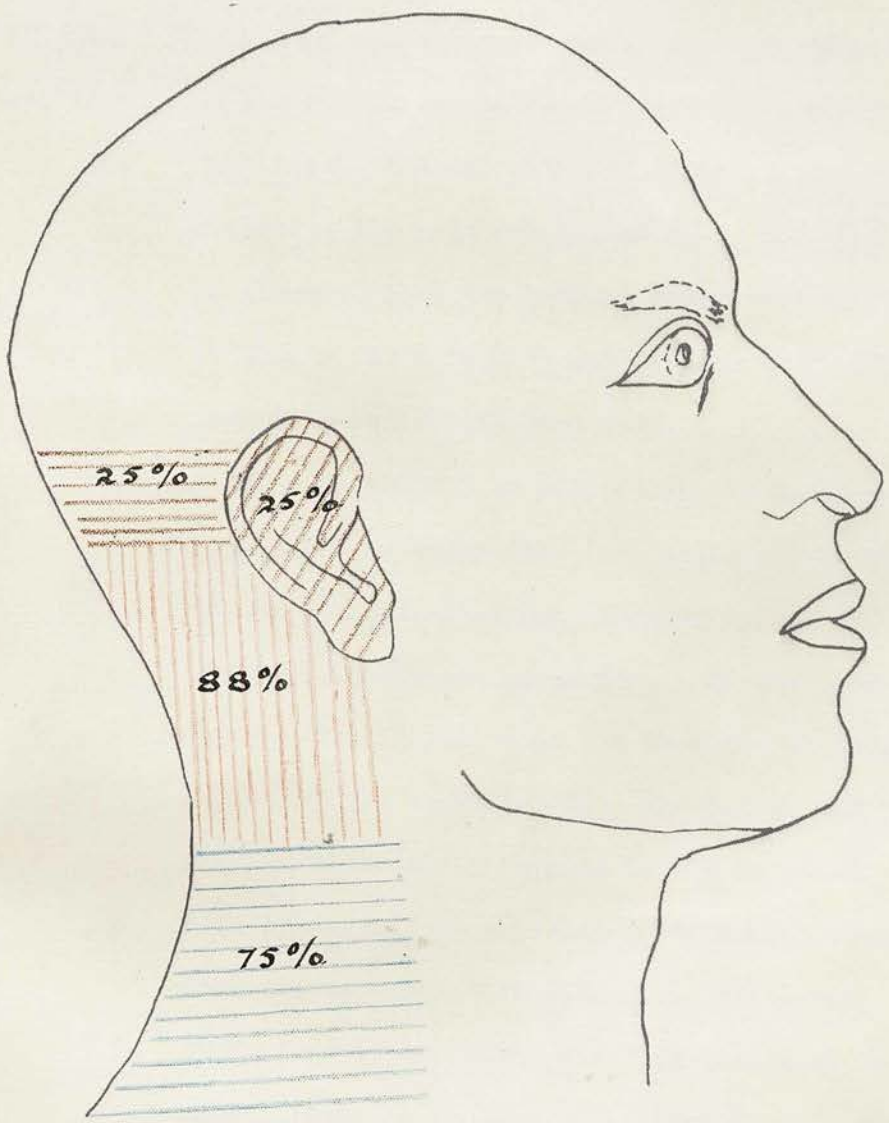
8 experiments on 7 cases.
Disturbance of equilibrium - 75%
" " autonomic system - 60%

The distribution of pain referred from the interspace C. 4.



12 experiments in 12 cases.
Disturbances of equilibrium 62%
" " autonomic system 62%

The distribution of pain referred from the level of interspace C. 5.



11 experiments on 8 cases
Disturbance of equilibrium - 58%
" " autonomic system - 58%

Fourty subjects were studied and one hundred and twelve mechanical or hypertonic saline irritations were made on these cases and fourteen received novocain infiltrations for the relief of pain. Their findings entirely confirmed those of Cyriax, and in view of their importance, require special notice here:

(i) They noted that the pain artificially produced resembled the pain complained of by the patients so closely, that the patient would regularly exclaim - 'that's it' - 'you've hit it' and so forth, when procain stimulations were made.

(ii) A definite allocation of pain in the cranial region occurred constantly from irritation of the structures in the occipito-atlantal condylar region and the first cervical interspace posterior. It was predominantly orbital and frontal from the condylar or basal region; predominantly occipital from the nuchal tissues, but with considerable reference to the forehead.

(iii) Pain produced from cervical interspinous ligaments from the second to the fifth interspace was predominantly occipital and upper cervical in distribution, with only occasional frontal reference.

Campbell and Parsons were the first to draw attention to certain concomitants to experimentally produced head pain. They stated that basal, suboccipital and interspinous irritations

almost constantly produced accompaniments of giddiness, listing and such autonomic disturbances as pallor, sweating, nausea and alterations in the pulse. Ptosis and tennitus were occasionally observed. The concomitants seemed proportional to the strength of the stimulus and its proximity to the suboccipital region. The concomitants were found to vary in intensity, extent and duration, not only with the amount of stimulation, but with the degree of pre-experimental pathology, for instance, the post-traumatic "head" syndrome, and they ranged from mild subjective discomforts to measurable objective deviations. Here there enters a psychiatric element. It is, perhaps, to be regretted that they do not state how many of the subjects were non-pathological and how many previous sufferers from headache.

The peculiar reference of head pain has been the subject of speculation by Cyriax (1941) and Campbell and Parsons, who both propound theories based on the embryological development of the head and neck. Cyriax draws attention to the cervical flexure which developes at about the fourth week of embryonic life and states that the whole of the head is developed from the back of the neck, and only the lower jaw from the front of the neck. On this account, he ascribes the faulty localization to the forehead of pain felt in the occiput to an error in the part of the pain perceiving centre in the brain, due to the developmental growth

of that part.

Campbell and Parsons discuss the reference of head pain at length in the light of the "confusing differences between the projections of dermatomal and scleratomal pain in the head and neck." They point out that there are fusions of segments at the occipito-cervical levels and that only presumptive traces of segments may be discerned anterior to the termination of the primitive notocord in the basal sphenoid. They suggest that phylogenetic and ontogenetic faults in development account for the generalised or heterotopic evaluation of pain from visceral or deep somatic structures. This seems to be a rather sweeping generalization.

The embryonic theories of somatic reference of muscular pain in the head and neck is difficult to reconcile with the view of embryologists on the origin of the musculature of the head and neck. The only head myotomes which can be recognised in eutheran mammalian embryos are four in the occipital region. Of these the first disappear early. The other three are developed into typical sclerotomes, dermatomes and myotomes. On the basis of comparative anatomy, it is thought that these three give rise to the muscles of the tongue. The external muscles of the eye arise from small aggregations of condensed mesochyme in the region of the embryonic eye, which are thought, on the analogy of the shark embryo, to have originated from three pairs of pre-otic myotomes. From the first

cervical to the third or fourth sacral myotomes arise the extensor muscles of the back. From the first to the eighth cervical segments arise the prevertebrals, scaleneons, geniohyoids and infra hyoids. So much for the somatic musculature. It is believed that the facial muscles and the occipitalis muscle arise from the second branchial cleft; the muscles of mastication, from the first and the sterno-mastoid and trapesius from the sixth. It is difficult to see how painful stimulation of the insertion of the sternomastoid should refer pain to the forehead if somatic pain is referable along the embryonic somites. Yet such a reference of pain is common. On the developmental theory, one would expect such pain to be referred to the trapesius, but this is a far less common occurrence. Nor do painful stimuli of the trapesius radiate to the sternomastoid so frequently as they do down the arm.

Campbell and Parsons point out that sensory impulses from the muscles at the base of the skull reach the central nervous system in the first and second cervical segments. The nucleus of the sensory (opthalmic) division of the fifth nerve, which receives sensations from the upper face and the regions within the cranial vault, reaches as low as the second cervical segment. This division is the non-branchial component of the fifth nerve and corresponds to the profundus nerve of the lower vertebrates, which is distributed to the apical region of the developing embryo. The

axoms of this nerve, and particularly those conveying impulses of pain and temperature from the fronto-orbital regions and from the dura and falx, tentorium and posterior fossa, synapse in the substantia gelatinosa of the two upper cervical segments. It is ligitimate to assume that there are intercommunications between these synapses and those conveying impulses from the muscles of the neck and suboccipital region which enter the same segments.

Pain is purely a defence mechanism. In lower vertibrates, a painful stimulus to the cervical region causes withdrawal of the head. In the mammalia whose development has proceeded to a complex differentiation of the innervation of the head, an arrangement whereby painful deep stimuli in the region of the occiput, would cause not only local pain, but a diffusion of pain to the frontal region, can only be looked upon as beneficial, in that it would premote rapid, reflex withdrawal of the head from the harmful stimulus. It is therefore reasonable, on phylogenetic grounds, to assume a close interchange of sensory stimuli between the ganglion of the opthalmic division of the fifth and those of the first and second cervical nerves. By the same reasoning, it is plausible to suppose that those stimuli received in the thalamus from the opthalmic division fifth nerve would overshadow those from the cervical region; an arrangement necessary in the interests of survival. A study of the reaction of the higher mammals to harmful stimuli, in the region of the occiput, might yield

information of interest in this connection. Stated crudely, as we are not equipped with eyes in the back of our heads, it is altogether fitting that pain in the neck should be appreciated in the region of the eyes.

In the consideration of any series of causes of headache, the similarity of the chain of symptom complained of is very striking and the similarity appears to become greater, the greater the severity of the pain. The general pain pattern varies little, however diverse the causes may be. The pain of megrain may be identical with that from a fibrous nodule. This phenomen is at first sight, rather unexpected, but it conforms with the findings of Lewis, who showed that deep pain, whether arising from somatic structures or from viscera, produces identical symptoms. For example; injections of hypertonic saline into the belly of the rectus muscle, just below and outside the navel, yielded continuous pain of unpleasant severity, having a character not to be distinguished from that of colic. It would appear that pain originating within the skull is of the same character as that which arises in the deeper structures around. (Lewis 1942).

Summary:-

(1) Pain may arise from within or without the skull, or in the skull itself.

(2) Pain within the skull arises from structures in the neighbourhood of the falx and tentorium. Distortion

or stretching of these structures may cause pain. Pain is procured by a sudden lowering of the cerebro-spinal pressure, and this is probably due to a dilation of the basal blood vessels with pressure of their walls on the neighbouring pain sensitive structures.

(3) Pain arising in the muscles, ligaments and fascia of the head and neck is projected to points at a distance from the point of stimulation.

(4) Pain from within the skull cannot be distinguished clinically from that external to it.

(5) The theories of pain reference in the head and neck are reviewed and it is suggested that by whatever mechanism this arises, it is in fact a defence mechanism on the part of the organism.

ANALYSIS OF ONE HUNDRED CONSECUTIVE CASES OF HEADACHE.

This investigation was persued in the course of general mixed practice in a seaport town in the South West of England. All persons who complained of headache as a presenting symptom were included, with the exception of those cases of headache occuring in the course of an acute febrile illness. The cases were drawn from a population pool of about 10,000, one fourth of whom may be assumed to seek medical attention from the investigator. Of this 2,500, one hundred were in receipt of medical relief, nine hundred were insured under the National Health Insurance Scheme and the remainder were private patients drawn from all income levels. It is thought that the findings are fairly representative of the community as a whole.

Method.

A card specially prepared was used, on which were noted the factors it was desired to investigate. (A copy of this card is shown in appendix 1). In this way a rapid assessment of the nature of the disability was arrived at even during the inevitable rush periods, and history taking, though brief, benefitted from its uniformity. Most of the cases were seen more than once and it was possible to review the first diagnosis when required.

Findings.

From the months of April to October 1946, one hundred consecutive cases were seen. The relative frequency of the various conditions met with and judged to be the cause of headache are listed in Table 1.

TABLE 1.

Diagnosis.	Percentage.
Fibrositis. Acute and Chronic.	87
Psychoneurosis	4
Defective vision	2
Migraine	2
Menopause	2
Frontal Sinusitis	1
Hyperpiesia	1
Undiagnosed	1
	100

Discussion of table.

The points of interest arising from the table are many and striking. The fact that the vast preponderance of cases of headache fall into the group of fibrositis was not unexpected by

the writer, who had had previous opportunities of noticing the frequency of its occurence both in civil practice and in the Army, at home and overseas. A survey of a few of the standard text-books of medicine reveals the fact that the condition has been for the great part over-looked and its importance entirely unappreciated. The literature of the condition is fairly extensive and will be reviewed in the fourth part of this thesis. It was only as the investigation proceeded that the full significance of the condition became apparent and it was noticed that many and diverse symptoms previously considered to be obscure or psychgenic in origin were ameliorated or cured by treatment directed to the fibrositis alone. Amongst these were tinnitus, vertigo and "blackouts", mental depression and "nerves". It would appear that frequent or constant pain in the head is quite sufficient to colour the whole psyche of the sufferer so that her mental outlook may become completely changed. Mild obsessional traits may become evident and eventually not only the patient, but the whole domestic scene may be upset. The sociological and economic importance of the rheumatic headache is indeed great. Section four of this thesis is devoted to the consideration of this syndrome.

Secondly, it is striking that only four of the cases in this series are considered to be psychogenic in origin. There were two cases in which the condition was probably hysteria and two

thought to be examples of anxiety state. One of the cases of hysteria was considered severe enough to be referred to a psychiatrist.

Two cases were attributed to the menopause, though the writer was, and still is, in some doubt as to how this state can cause headache. The condition of both these patients improved with the administration of hexoesterol.

Two only were found to have defective vision. The pain in these cases was worse in the evenings and after using the eyes, as for sewing or reading. It is interesting and contrary to current opinion that eye strain should account for so few cases of headache. Most cases of eye strain due to defective vision complain more of a tiredness in or behind the eyes themselves than of actual pain.

Disease of the nose and accessory sinuses also appear to be a far less common cause than is currently supposed. The one case seen was complaining of "neuralgia above the eyes". He was tender over the frontal ridges and his condition was relieved by inhalation. No satisfactory reason for frontal sinus pain has been adduced. The sinuses are insensitive to pain.

A consideration of the work of Pickering referred to above (p. 9) will make the fact that only one case of hyperpiesia is included appear less extraordinary than it otherwise would.

The author is well aware that many causes of headache are not included in this series. Some because they are sufficiently rare for them not to be met frequently in general practice. Amongst these may be listed cerebral tumour, diseases of the eyes such as glaucoma and iridocyclitis and conditions of the central nervous system. Other conditions in the symptomology of which headache is prominently featured have been met but are not included because the patients did not complain of headache, or if they did, it was evident that the headache was not attributable to that disease but was caused by concurrent chronic fibrositis. Under this heading are the anaemias and nephtitic.

IV.

THE RHEUMATIC AND FIBROSITIC HEADACHE.

Notwithstanding the frequency of this type of headache, and in spite of the considerable literature which has grown up concerning it, its clinical course, and its manifestations appear still to be little understood.

It is intended in this section to review the history and literature of the condition and then to analyse the symptomatology of one hundred consecutive cases. Additional cases will also be included where they illustrate particular features of outstanding interest.

Literature.

The first modern account incorporating the results of the work of Lewis and Kellgren is that of Cyriax (1938). Cyriax states that a hasty review of the literature disposes of any claim to originality which his work might at first sight appear to have, and he proceeds to give a note on the history of the condition. He thinks that the rheumatic headache was probably first described by Schonleich in 1615, and proceeds to enumerate other early writers who came to the same conclusion. Morgan in a thesis "De Dolore Capitis" presented to the University of Edinburgh in 1769 also remarked that headache might be rheumatic in origin and that in such cases it was due to spasms of the neck muscles with

resulting ischaemia. Weatherhead in 1835 and Wright in 1856 remarked on the reference of pain to other parts of the head. White in 1912 is stated to be the first to note that pain in the ear might be due to distant myositis.

Yawyer in 1909, drew attention to indurations in the scalp which he stated were a common cause of headache. He gave a good clinical account of the condition, illustrating it with three cases including that of himself. His remarks are still valuable on that account. He stated that massage was the most effective form of treatment, and often produced cure.

Llewellyn and Jones in 1915, in their monumental work on fibrositis, gave a very full and complete account of the condition. They drew attention to the close relationship between fibrositis of the epicranial muscles and the fibrositis of torticollis and considered that the neuralgic nature of the pain was due to the impinging of fibrous nodules on contiguous nerve trunks. They give a good description of the common sites of the nodules. Their clinical account is sound. They state:-

"The clinical picture presented under such circumstances is "naturally very diverse and may simulate hemicrania or megrain "or cranio-occipital neuralgia, while in some cases "brachialgia may also be present. At first the condition "consists in isolated attacks of headache or neuralgia, with

"intervening periods of freedom. But in the presence of "deposits the tendency to recurrence is inveterate, and "ultimately the patient is hardly ever free from pain or "discomfort. It may radiate upwards over the whole scalp "and through the associated spasm of the cervical muscles, "the head and neck are held in a state of painful rigidity."

They considered that frontal reference was rarer than occipital. They stated that some authors have noted that the pain may be increased by ocular movements and that the conjunctiva may be suffused. They found that subjects to rheumatic headache were unusually susceptible to draughts or exposure to damp. "Railway travelling, and in recent years, motoring, are frequent causes of relapses or exacerbations". They further noted that when the condition was long-standing there was considerable mental and physical depression, sufficient indeed, to reduce the subject to a state of chronic invalidism. They stated that dispersal of the nodules by massage caused the headaches permanently to disappear and emphasised that:-

"the importance of these so called indurative headaches "lies in the fact that their true cause but too often "passes undetected."

Michael Kelly (1942) drew attention to the frequent occurrence of the syndrome in Australia and was the first to

notice the connection between trauma and occipital fibrositis. He further commented upon the fact that treatment of the tender nodules in the occiput could cause headaches previously attributed to such conditions as high blood pressure or cerebrospinal meningitis to disappear. He summarised forty such cases giving details of eleven. In a later communication (1946) Kelly mentioned that he had notes of one hundred and thirty cases of occipital fibrositis.

O.W. Jones and H.A. Brown (1944) treated one hundred and twenty cases of post-traumatic headache with injections of procain hydrochloride. Injections of procain had been advocated previously by Cyriax (1938) and by Kelly (1942). Jones and Brown used 20 - 30 c.c. injected deep into the subcutaneous structures, fascia and muscles down to the periosteum. They report 50% good results i.e. relieved of the symptoms completely or in great part, and able to return to their regular occupations. A further 30% were definitely improved while 20% showed no improvement. They mention the common train of symptom: headaches, constant or intermittent, (usually the latter), and invariably brought on by change in posture or exertion; visual and auditory disturbances; vasomotor and emotional instability; fatiguability; nausea and occasional vomiting; impaired memory and concentration.

To sum up, the condition has been recognised spasmodically

by individual Writers throughout the last 300 years; the distribution of the pain has been experimentally mapped out; and yet the condition remains a rarely recognised entity.

Causation.

Fibrositis or fibromyositis is a condition of the muscles and fascia and bursa associated with painful, often palpable, nodules situated in the affected part. The pain follows the normal distribution of pain associated with the affected structures and is distributed segmentally through areas which have been experimentally plotted. Fibrositis is considered to belong to the group of rheumatic conditions and may occur spontaneously, in which case it is termed primary fibrositis or it may follow trauma or febrile diseases such as influenza, and also, in the opinion of Kelly, may be secondary to such diseases as meningitis, angina or the abdominal colics. Chilling, the exposure to draughts and rapid changes in atmospheric pressure are acknowledged factors in initiating the attacks of pain.

The frequency of occipital fibrositis is such as to lead the writer to believe that the neck muscles are more often afflicted by the disease than those of any other part of the body. It is certain that while collecting one hundred cases of this condition nothing near the same number of cases of fibrositis of the lumbar region or the shoulder girdle were seen. There would seem to be three reasons why fibrositis of the neck should be more common

than those of other parts.

(1) There is no part of the body so exposed to sudden changes in the atmospheric pressure and to chills and draughts, as is the back of the neck. Hats, and in most, a sufficient crop of hair protects the head and the body; arms and legs are protected with a covering of clothing sufficient to prevent any sudden atmospheric changes.

(2) Secondly, fibrositis has been observed to occur most frequently in those muscles which perform their work without any great range of stretch. For example, the erector spinae, the trapezius and the latissimus dorsi and rhomboids are more frequently affected than the biceps and triceps, the ham strings and muscles of the calf. The muscles inserted into and arising from the suboccipital area would on analogy appear to be favourable soil for the implantation of fibrositic deposits.

(3) Thirdly, the well known prediliction of fibrositis for scars in muscular tissues must be remembered. The fact that the skull contains the brain has so hypnotised the attention of workers on that vital but relatively anagesic organ that the effects that a blow on the head is likely to have on the musculature supporting it have, for the most part, been ignored. Yet any sudden blow on the head must cause strain on its supports. Head injuries of a minor kind are quite frequent. Most people have, at one time or another, bumped their heads.

The cause of fibrositis is still under dispute. The disease is one which has, doubtless on account of its relative benignity, received less attention than it warrants. Comroe (1944) wrote:-

"Prior to World War II, some rheumatologists were not "convinced that fibrositis could be claimed as an entity."

While Americans have recently had to modify this view, lack of interest in the condition is still very evident in this country.

Leucocyte counts and blood sedimentation rates are invariably normal in uncomplicated cases, and no specific bacteria have so far been isolated. Septic foci have been invoked, but without conclusive evidence. Allergy has been called in to account for the condition, but here again, evidence is lacking. Many cases appear to suffer from psychoneurosis but whether this is the primary disability or whether the mental instability is consequent upon long-standing unrelieved pain is at present debatable. Cook (1946) claims that tests for liver deficiency are positive in a large number of cases but he neither states what particular tests nor gives figures to support his claim. Copeman and Ackerman (1944) carried out a series of post-mortem dissections, as a result of which they describe a basic fat pattern, which persists even in the most emaciated subjects. This fat lies between the superficial and

deep fascia. In ten cases of fibrositis, incissions were made over the points of tenderness after they had been transfixed with a needle, and on dissection fat hernias, painful on manipulation, were discovered. Removal of these hernias produced lasting cures. These findings are attractive but require further investigation.

The present investigation throws no light on the vexed question of causation.

Etiology.

The experience of the author in the Services has led him to believe that rheumatic fibrositis headache is uniformly common throughout the country. Kelly (1946) has reported on the frequency of the condition in Australia, and Jones and Brown have reported on a series of one hundred and twenty cases of post-traumatic headache in California. The writer during 3½ years in India does not remember to have seen any cases originating in that country, other than those of traumatic origin, either amongst the European or the Native population, although fibrositis in other parts of the body were occasionally met. The disease is probably one predominantly of temperate climates.

Age incidence.

The condition may occur at any age. In ths present series ages ranged from 4½ to 88 years, but was commonest in the 30 - 39 decade. The incidenceper decade is set out in the accompanying

table.

Age	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59
% cases	3	6	19	19	17	18
% age at onset	4	18	17	24	12	11

Age	60 - 69	70 - 79	80 - 90	-	-	-
% cases	10	5	3			
% age at onset	7	5	2			

It will be seen that if the population figures from the corresponding decades are taken into account the age incidence is fairly uniform. Some of the very worst and most intractable cases however gave histories dating back to childhood and adolesence and the long years of pain and discomfort which these unfortunate people have suffered does stress the prime importance of early recognition of this complaint.

Sex incidence.

Seventyeight of the one hundred cases investigated were women or girls. This is interesting, for it is usually held that fibrositis is more common in men, and their more strenuous

and often more open air life is given as the reason for this.

Effect of weather.

35% of the chronic cases noticed that their headaches were affected by the weather. Some remarked that they were good weather glasses; others that wet weather or windy weather brought on their headaches. 9% experienced headaches in thundery weather.

The writer had the good fortune to see one case during a thunder storm. The patient, a widow, aged 35, was suffering from a prolapsed intra-vertebral lumbar disc. She stated that she always suffered from headache when it thundered. Closer questioning elicited the fact that she was a frequent sufferer from headache, independent of the state of the weather. The headache was bilateral and frontal in site. Pressure on the jugular veins had no influence on it nor was it effected by carotid compression. There was marked tenderness over the insertion of the occipital muscles, a fact previously unnoticed by the patient and deep massage of these tender points relieved the headache. There would seem to be little doubt that this headache was due to an occipital fibrositis, and that atmospheric conditions, whether due to sudden barometric alterations or to electrical disturbances, were factors of its onset.

A history of rheumatism past or present was obtained in 62% of cases. When rheumatism in other parts of the body was present

at the time of examination or occurred later in the course of the disease it was usually fibrositic in nature and manifested itself as lumbago or painful shoulder or sometimes as a painful puffy knee. One case developed a puffy painful knee joint, had slight fusiform swellings of the finger joints with an increased E.S.R. to 20 (Westergren) in the first hour. The symptoms subsided after a course of collosol auro-calcium, the E.S.R returned to 6 and a tentative diagnosis of early rheumatoid arthritis was held to have been confirmed. Several cases had degenerative joint disease of one or more joints. A past history of rheumatic fever was obtained only in two cases.

Of those cases which were classed as acute, only 33% gave a history of rheumatism.

Anaemia.

Headache has often been stated to be a symptom of anaemia. Three cases in this series had anaemia of the microcytic hypochromia type with haemoglobin levels at 50%, 60% and 80% Sahli. During the course of the investigation probably a dozen cases of anaemia both hypochromic and hyperchromic were met in which there was no complaint of headache. It is regretted that accurate figures for these have not been kept but the absence of headache in the presence of anaemia has been remarkable. The present investigation does not however, indicate whether or not anaemia may be a factor in the activation of fibrositis.

The onset of menstruation, was stated by some of the female patients to cause the headache. In these it was often noted that the headache would also occur at other times. It is thought that the onset of menstruation may in some way activate the rheumatic fibrositis. The frequency of low backache amongst women at their periods is well known and its cause has never been satisfactorily explained. The connection between fibrositis and the period pain is a field of investigation which might yield useful results and is here put forward merely as a suggestion.

Symptomology.

Cases may be classed as acute and chronic but there is no essential difference in the clinical picture presented by the two groups, and the acute cases should be regarded as primary attacks which may subside never to recur or they may recur at intervals varing from six months or more to as often as every day. The condition may not subside and the patient may suffer varying degrees of discomfort constantly for months or for years.

In the present series 32% were considered to be acute. It is not intended to describe these separately.

A common history is of headache coming on in the first place either spontaneously or after an attack of influenza, bronchial catarrh, or indeed after any acute febrile illness or it may intervene in the course of an attack of fibrositis of

other parts of the body. The headache passes off after a few days, a week or a month and is sometimes forgotten until it returns, at first occasionally, but later at more and more frequent intervals.

The patient may seek advice primarily for the headache or, quite often, the headache symptom may be combined with other various complaints - tiredness, general weakness, inability to concentrate, vomiting and giddiness are common. Sometimes noises in the ears, fainting attacks and "blackouts" may be mentioned. The headache may be complained of by the patient during the course of treatment for other diseases. So common is the symptom, so little interest in it is taken by the doctor and so temporarily effective is the dose of aspirin, that patients hesitate to seek advice solely on account of it. In the present series, some had previously sought advice but not obtained relief. One had clamorously done so for many years without the condition being recognised. In others the impression was obtained of a condition, which, bearable whilst in health, became intolerable when the system was weakened by disease. Anaemia, bronchitis and cardiac dysfunctions are instances of this.

The headache may be described as diffuse over the whole head, sometimes it is stated to be like a tight band through the head. It may be constant; it is seldom throbbing, occasionally it is

shooting or lancinating and of the neuralgia type, and occuring at intervals through the day. The pain is usually described as deep and boring in character. Little importance has been attached to the descriptions of pain given by patients in this series. Lewis has stressed the identicality of the pain produced by deep structures and in most cases it has been possible to reproduce the pain by pressure on the point of tenderness to the entire satisfaction of the patient. It is bilateral more often than unilateral, (17% were unilateral in the present series), although some of the longest sufferers had always experienced the pain on one side only. The pain is often worse on waking in the morning and patients have remarked that an unusually sound sleep is a sure herald of a headache that day. The pain often diminishes as the day passes but sometimes returns in the evening. Insomnia is not a feature with these patients but the remark that they would not go to sleep without an aspirin is often heard. Although 44% of the present series confessed to such defects of sleep or either not getting off or waking early, or being awakened often with the headache, comparatively few made a major complaint of sleeplessness or required any hypnotic medication.

Most frequently, the pain is frontal and on questioning, the patient will place his hand over the eyes. Sometimes it is stated to go straight into the eyes. From the frontal region

it may spread back over the head to the occiput, or the vertex may be free of pain and only the frontal and occipital region be complained of. The pain was purely frontal in 24% of cases, and purely occipital in 8%. In all, 78% patients complained of frontal pain, 28 of temporal, 26 of pain over the vertex and 49 in the occiput. In no case in this series was the pain only experienced over the vertex. It was noticeable that patients with frontal reference would usually describe the pain as occuring there and passing back over the head. Many patients with frontal reference were completely unaware of any pain or tenderness in the occipital region and this interesting fact was observed even amongst those who had suffered severely for as much as twenty or thirty years.

Tender points and nodules were sought in the nape of the neck and were found in all cases. The nodules might be in any area from the mid line to as far laterally as the tip of the mastoid process. The commonest site appeared to be in the lateral corner of the base of the triangle formed by the insertion of the trapezius and the sterno-mastoid occipital insertion. Sometimes thickening and crepitus of the longtitudinal ligament of the spinous processes of the cervical vertibrae was felt. In some cases the whole of the nape of the neck appeared thickened and brawny. When definite palpable nodules were felt,

they were commonly about the size of a lentil (5 - 6mm: in diameter) usually circular or fusifern in shape and slightly movable over the underlying structures. When the searching fingers passed over one of these tender points there was usually immediate flinching on the part of the patients and the headache was accentuated and often the patient would place his hand to his forehead.

No attempt was made to map out the relative frequency of the various sites of election for the nodules, but, as the investigation proceeded, it became clear that by taking a concise history of the site of the pain it was easy in many cases to place ones finger without hesitation on the point of tenderness. Exceptionally the nodules lie deep in the flexure of the acciput and require patience to seek out, and occasionally painful nodules were found over the occipitalis aponeurosis.

Concomitant symptoms.

Besides the main complaint of headache, certain other closely connected symptoms were met with great regularity. Some of these have not previously been described in this context and as they appear to add to the significance and importance of the syndrome described they are here considered in detail.

(1) Scalp tenderness. The fact that the scalp may be tender during an attack of neuralgia is well known. 51% of the cases

in this series admitted to pain in the scalp. To each case the questions were put - "is your scalp sore?" and "does it hurt when you comb your hair?" It soon became evident that the area of soreness in the scalp was quite inconsistent with the area in which the headache was experienced. Thus a patient complaining of frontal headache would at once put her hand to the back of her head on being asked if it hurt when she combed her hair. The reason for this appeared obscure until it was realised that here was a very good example of the nocifensor tenderness of Lewis. Lewis (1936 - 1942) noticed that many subjects, but no means all, after a small injury to the skin became conscious of a soreness of the surrounding area. He described this soreness as being "not often so conspicuous that attention is constantly called to it by contacts of clothing." The stimulus he found must be of some duration - several minutes - and must be painful. He showed that the effect was not dependent upon the C.N.S. for a block below the point of stimulation of the nerve did not produce hyperalgesia whereas a block above did after the anaesthetic effect of the block had worn off, even though the painful stimulus was not appreciated as such. Lewis then proceeded to show that a similar cutaneous hyperalgesia could occur from painful stimuli of deeper lying structures both visceral and somatic and he attributed the hyperalgesia of visceral disease to reflexes transmitted through

a nocifensor system of nerves (Lewis and Kellgren 1939). The tenderness of the scalp in occipital fibrositis is completely analogous to the hyperasthenia met with in cases of lumbago and sciatica of fibrositic origin.

(2) Tinnitus. Thirtythree of the patients in this series complained of noises in the head or ringing in the ears. All degrees of severity were met, from an occasional beating to loud noises, as one patient said - "like George's bell." The common complaint was of rushing or beating noises and a sailor described it as "like water flowing".

It was noticed during the course of this investigation that the symptom usually improved pari pasu with the amelioration of the head pain. It was, therefore decided to make a therapeutic test in suitable cases.

> Case S.L. A lady aged 57 complained in February 1946, of noises in the right ear, "like birds singing" of several months duration. No obvious sign of aural disease was seen but eustachian disease was suspected. This failed to respond to conservative treatment and on 25th March she attended an aural surgeon who reported - "this patient's tinnitus is due to some inner ear degeneration. I have ordered her someluminal tablets and if they help you could continue them." But the luminal did not help and the patient was not again seen until 17th September 1946 when she was also complaining of pain down the right shoulder. A trigger point was found over the posterior border of the mastoid process pressure on which was extremely tender. The patient admitted to having had for sometime past soreness in the area behind the right ear.
> Treatment. The patient was told that the sore place was to be injected and that the injection would certainly

help the pain and that it might stop the noises in the ear. 2 cc of 1% procain in normal saline were injected and the patient reported immediate cessation of the noises. Two days later she stated that there was a marked improvement although the noises were still faintly present. A further 2 cc of procain were injected into the point of maximum tenderness and she reported two days later that the noises had completely ceased. Seen one month later she was complaining of abdominal pain due to fibrositis of the abdominal wall. She stated that she had had no further tinnitus.

Case No. 113. A lady, aged 49, complained of occipital and frontal headaches of 18 years duration. These headaches had been treated by massage with great benefit. She also, had had symptoms of rheumatism in the knees and wrists with a E.S.R. of 10 (Westergren) in the first hour. For this she had received a short course of gold, which had been discontinued at her own request.

On 13th November 1946, she attended complaining of ringing in the right ear. This had been present for several weeks and was accompanied by "giddy attacks". On examination the auditory canal and drumhead appeared healthy but pressure over the sterno-mastoid insertion and the mastoid process elicited tenderness. 2 cc of procain were injected into each of these points.

On 18th November 1946 the patient outlined the following sequence of events. The injection abolished the noises for three hours, after which they returned in a lesser degree, - they were heard, as it were, afar off. They finally faded within 24 hours and had not returned at the time of interview.

Case No. 2. A lady aged 68, had suffered from headaches described as migraine for from 10 - 15 years. The headache had recently become more frequent and when first seen in April 1946 had been recurring at intervals of from 7 - 10 days. The headaches were always in the right side and the patient would draw on her head a distribution identical with that of the opthalmic division of the 5th cerebral nerve and extending backwards to the occiput. The headaches were always relieved by fermergen by injection. For three months past she had suffered from a pulsation in the right ear. The noise never ceased and caused considerable annoyance.

This patient was seen during many attacks of headache.

When they commenced she would go to bed in a darkened room and complained of violent pain in the right side of the head, and in the right side of the upper abdomen. Trigger points of tenderness were present in the scalp, the sub-occipital region and in the angle of the last rib with the erector spinae. Injections of novocain into these points did not appreciably help the headache but intravenous injection of fermergen relieved it in two hours. Neither pressure on the jugular veins nor on the carotid arteries affected the degree of pain. The blood pressure was constantly low and in the region of 116 systolic; 70 diastolic. The patient was not sensitive to histamine by intradermal injection.

In January 1947, during an attack an injection of procain into a tender point in the region of the right mastoid process was given. Thepatient was not told the reason for this, but led to believe that it was an attempt to relieve the headache. The pulsation in the ear ceased from the time of the injection.

Case C.2. A Belgian lady, aged 56, complained in December 1946 of pain in the neck and noises in the ears. The pain in the neck had been severe for three weeks but had been recurrent for a long time. It was confined to the left side, was worse in the mornings and would last for six hours or more. The noises in the ears were described as drumming or boring in character and the right ear was worse than the left. She had occasionally suffered in the past from lumbago.

She was nervous and worried. On examination, considerable spasm of the left sternomastoid was found. There were definite tender nodules in the origin of the occipital ridge near the insertion of the sternomastoid on each side. The scalp was tender to touch as also was the skin over the left side of the neck. The external auditory canals were both healthy and no disease was detected in either tympanic membrane. There was no obvious deafness.

Treatment. 2 cc of 1% procain in normal saline were injected into each tender nodule. The patient reported immediate improvement in the pain which became quite bearable. The noises in the ears improved as much as the pain. Four days later she placed the degree of improvement at 80%. She was then given deep massage thrice weekly for two weeks, after which she stated that the noises in the ears had practically ceased. The mental outlook of this patient had improved greatly.

Case S.5. A Publicans wife, aged 42, complained in December 1946 of a buzzing in the right ear which she had had for six years. It was present every time she lay on the pillow at night and whenever there were no other noises to distract her attention. It was like the drone of an aeroplane. She was subject to a "neuralgia" headache which used to come on with her periods, but recently, since the buzzing had started, had been much more frequent. The headache was also on the right side, would spread from the occiput to the right eye, and was worse on waking in the morning. During the headache the scalp over the occiput was tender. She did not suffer from sleeplessness. A month previously she had been treated for "blood pressure and nephritis" on account of swelling of the eyelids. At the time of examination her cardiovascular system presented no abnormalities and her urine was normal. There were no signs of disease in her ears. She thought her nerves were out of order.

A tender nodule was present near the mastoid process on the right side. Massage to this temporarily relieved the buzzing.

Seen a month later 4 cc of procain were injected into two tender nodules. One month later in response to questioning she stated that she had had no further neuralgia and that the buzzing had only recurred twice and this with only a very small intensity.

Discussion of cases.

Campbell and Parsons (1942) in their work in the experimental production of head pain (see p. 14) remark on the occurrence of tinnitus. The five cases recorded above demonstrate that this tinnitus may be produced by pathologic painful lesions in the deep structures of the neck. The cause of this is obscure but it is possible that the manifestation of tinnitus is a "nocifensor" reaction of the nerve of special sense, fed from the cochlear, giving rise for this reason, to sound instead of pain. In this way the sometimes bizarre noises heard might be accounted for.

It appears to the writer that for noises in the ears to be produced, the point of tenderness has to be in the lateral part of the occipital ridge or along the process of the mastoid itself, but this has not been subjected to special investigation.

The obvious criticism that the noises are of psychic origin is met by the fact that in all these cases fibrositic pain was present. In case 2, the patient had no idea of the fact that treatment was being directed to her tinnitus. The treatment adopted had been previously administered to other parts and the patient was not asked about her ear noises until the next day.

(3) Nausea and vomiting. The association of headache with sickness is well known. Vomiting is a terminal phase in most cases of migraine and the projectile vomiting of cerebral compression is of diagnotic importnace. The complaint of biliousness however, in spite of its

frequency, has always presented difficulties in the way of a satisfactory explanation. It is difficult to explain how an organ the size of the liver which is capable of assimilating gross insults without protests, should, on occasions and without obvious provocation, suddenly produce pain in the so distant a part as the head and that this should be followed by vomiting. The sequence of vomiting followed by headache produced by the alteration in cerebral pressure consequent upon the urging would be understandable but this is not the usual sequence.

In this series, twentyeight of the patients admitted to nausea or vomiting at one time or another during the course of their complaint. Most commonly the nausea was described as slight, but in some cases attacks of vomiting were a major symptom. The following case is illustrative.

> Case 3. A spinster, aged 52, a typist in a Bank, complained on 1st April 1946 of attacks of headache and sickness described by her as bilious attacks. These attacks came on at about six-weekly intervals and would last about one day. They had recurred for two years. The headaches were very severe, were always left sided and had recently been associated with ringing in the left ear. The scalp was hypersensitive; she felt as though there was something on the top of her head. In response to questioning she admitted to rheumatism in the neck and in the little finger. Her E.S.R. was 5 in the first hour (Westergren). An extremely tender nodule was located below the left occipital ridge near the insertion of the trapesius. She was treated by deep friction to the tender nodules. Her bilious attacks were completely cured and have not returned at the time of writing (1st March, 1947).

(4) Giddiness. Giddiness or listing was observed by Campbell and

Parsons to occur in 85% of cases when an experimental lesion was produced in the sub-occipital region. Giddiness was not specifically sought during this investigation but in eight patients it was a major complaint. The mechanism causing it is not clear. Four of the patients had blood pressures considerably above the normal, and one of these was fibrillating. All the cases had definite tender "trigger points" in the sub-occipital region and all were improved by treatment of the tender nodules. Two cases which occurred in young girls are quoted:-

Case 107. A girl aged 20 employed on a milk round, complained of giddiness, vomiting and headache of 24 hours duration. The headache was bilateral and frontal. Temperature was normal, pulse regular in time and force and not accelerated. There were no specific signs of disease except for tender nodules medial to the mastoid process on each side. These nodules were treated by deep massage with immediate improvement in the headache and the vertigo. She was instructed to continue a daily massage of these points at home. One week later she reported complete relief from headache and giddiness.

Case S.4. A girl aged 19, a shop assistant, complained of giddiness and headache. For one week she had had swimming in the head and experienced feelings as though she was going to faint. A left sided frontal headache had appeared 24 hours before examination. The only sign of physical disease was a tender point in the region of the left sternomastoid. Deep massage to this point relieved the headache and massage applied at home for one week completely cured the condition.

Case No. 109. A widow aged 70, complained on 28th October 1946, of pains in the head and giddiness of five days duration. The pains which were intermittent came on for five minutes or so three or four times a day. They were associated with giddiness. They were bilateral and spread over the whole of the head.

On examination there was intense tenderness at points at

each side of the occiput and the scalp was sore over the area of the occiput and vertex. Her pulse was irregular in time and force and her blood pressure was 210 systolic 140 diastolic. She gave a history of previous heart disease.

The patient received massage to the tender points and was seen again two days later. There was definite improvement in the headache and giddiness. Auricular fibrillation was treated by digoxan t.d.s. Four days later after two further massage treatments the giddiness had ceased. Fibrillation with an A.B. rate of 130 was still present.

Seen three months later, the patient has had no return of the giddiness or headache. She was still suffering from auricular fibrillation.

Discussion of cases.

The connection between the headache and the giddiness in cases 107 and 54 seems to be obvious. They illustrate a fairly common syndrome. In case 109 the symptoms of headache and giddiness which were associated with very tender points in the occipital ridge cleared and were controlled with much greater rapidity than the concomitant auricular fibrillation and hyperpiesia.

(5) Eyes. The rheumatic headache appears to affect the eyes in two ways. It may, rarely, cause definite oedema of the lids and sometimes a suffusion of the sclerotic. Secondly the headache itself may impair the acuity of vision, so that it is common for patients to present letters of introduction to opticians and opthelmologists for signature with the explanation that they were getting headaches and that their eyes were tiring easily. The

vision of two such cases was tested by an opthalmic surgeon and found to be normal. These patients reported improvement in vision after a course of massage for their fibrositic.

(6) Head injury. A history of head injury was obtained in twenty cases but it was considered to be of significance in only twelve cases, and only four of these themselves appeared to attach any significance to the injury. All four were war injuries.

Case No. 15. A naval rating, aged 25, received a blast injury whilst on his ship in 1942. Since that time he had suffered from intermittent headaches which would last for about 24 hours and return about every four days. The pain was situated over the frontal and temporal region and was always worse after a journey. Sometimes the pain made him feel sick, at other times he suffered from giddiness and sometimes he was kept awake by a buzzing in his ears.

On examination, very marked tenderness was present in the occipital region and massage to these points gave instantaneous relief leaving a numb feeling over the forehead.

Case No. 69. A naval rating, aged 26, was involved in a car accident during an air raid on Alexandria in 1941, sustaining a scalp wound. X-ray of the skull showed no fracture. Seen on 23rd April 1946 he complained of headache of five years duration with on the day of examination, "hot and cold turns". The head pain was right sided; involved the frontal and temporal regions; and intermittent, lasting for two or three days at a time, at intervals of from a week to a month. The headache had been sufficiently bad to cause him to report sick frequently. On these occasions he was given tablets to relieve the pain. On examination a very tender nodule was present in the right sub-occipital region. The scalp was tender over the same region. Massage improved the headache for a short time. Injection of 2 cc 1% procain in physiological saline into the tender point accentuated the pain for a few seconds after which the pain was abolished for 24 hours. It had not, two days later, returned so badly. Two further injections were given and the patient reported great improvement.

Case No. 79. A war pensioner, aged 51, received a shell wound of the left side of the scalp in 1916. Since that time he has complained of intermittent headache which usually lasted for two or three days and had lately returned after two or three days interval. The right side was worse than the left and the frontal region alone was involved. Sometimes he got a stiff neck and he suffered from rheumatism in the left leg. Palpable tender nodules were present beneath both occipital ridges and that on the right side was worse than that on the left. The scalp was tender over the area of the wound.

An injection of 2 cc 1% procain was given into the tender nodule on the right side with immediate relief of the pain.

(7) Disturbances in the mental equilibrium. It is well known that mental symptoms may colour the whole existence of the post traumatic headache patient. This is usually attributed to an anxiety state arising out of the inevitable mental "trauma" accompanying any head injury. Two cases of fibrositic headaches are reported here in which definite symptoms of mental disease overshadow the headache symptom.

Case No. 42. A married woman, aged 36, complained that her nerves were on edge, she was aching all over and she suffered from headaches. Six months previously she had had influenza and her symptoms dated from that time. She was very depressed and nervous and attended only under the pressure and moral support of a neighbour. She stated that she was afraid to go out. If she entered a shop she felt like screaming and running away. Any sort of a crowd was unbearable. Prior to attending she had been constantly under treatment for her "nerves" and had received a large amount of sedatives on this account. The headaches were continuous, but worse in the mornings and when she went out. They were frontal and accompanied by a sensation of pressure in the temples and a patch of hyperalgesia over the vertex about 3 inches in diameter was present. Although the headaches were unaffected by the weather, she experienced stiff neck when she sat in a draught. There was no history of rheumatism. There were tender palpable nodules in both sub-occipital triangles.

She was treated by massage and the headaches were relieved after fourteen days treatment. Her nervous symptoms improved along with the improvement in the headache.

Case No. 56. A widow, aged 81, complained in July 1946, of headache and pain in the right shoulder. The headache had been present off and on for thirty years, and had been continuous for five years. As a young girl she had had otorrhea and at the time of interview was very deaf. For as long as she had had the headache she had suffered from buzzing in the ears. Five years ago she received a bomb injury, involving her head, and there was a scar on the forehead. Since that time she had suffered more severely from headache and noises in the head had become very troublesome. Seen again on the 20th February 1947, she was complaining bitterly about the noises. There were also voices to be heard and the severity of the complaint was indicated by the patient's description that it was like a fair ground. 4 cc of 1% procain was injected into tender nodules in each sub-occipital triangle with almost immediate amelioration of the symptoms. The patient's general attitude was vastly improved, she looked brighter and stated that her head noises were very much less and that there were no voices now.

Diagnosis.

So common is the condition that any case of headache presenting for diagnosis should be suspected of being due to fibrositis until it is proved to be due to some other cause. This is a sweeping statement, but justified by the amount of unnecessary suffering which may be caused by neglect or failure to recognise the true cause of the pain.

When the complaint is of headache alone or of headache associated with rheumatic pain in other parts of the body, no difficulty is likely to arise. It is those cases which are associated with giddiness, fainting attacks, nausea and vomiting

which are likely to be overlooked unless the probability of fibrositis is constantly remembered. In these cases, the headache symptom is often overshadowed in the mind of the patient by the more alarming and often more unpleasant subjective symptoms. This is frequently so in acute attacks.

Diagnosis of the fibrositic headache is dependent upon a careful examination of the head including palpation of the occipital ridges, the scalp and the back of the neck. It would seem that it is commonly the neglect of this elementary proceedure which accounts for the frequent failure to diagnose correctly this condition. A routine examination of all the systems should not be overlooked but it must be stressed that a positive finding such as increase in the blood pressure or the presence of constipation in no way vitiates a diagnosis of fibrositis.

When a tender nodule is found, and this is usually easy in these cases, pressure on it may cause the headache to be accentuated. If, however, the nodule is very tender, the pain at the point of pressure will mask any projection of pain produced, and the pain will be felt at the site of the nodule only. Rarely, firm pressure on the painful point will ease the headache.

Confirmation of the diagnosis may be obtained by administering deep massage to the point of tenderness. This will almost invariably relieve the pain, if only for a short period. Further

confirmation may be obtained by injection into the painful points of 1% procain. Two cc is usually sufficient for each nodule.

Pressure on the jugular vein makes no difference to the intensity of the fibrositic headache and this is a useful test when doubt arises as to the true nature of the headache.

If the points mentioned above are borne in mind, little difficulty should be experienced in arriving at a correct diagnosis. Occasionally it is not easy to differentiate from migraine, in which condition areas of hyperalgesia may appear in the sub-occipital region and the scalp. In such cases nodules are not palpable and injections of procain do not relieve the pain. The tender areas usually disappear soon after the cessation of the headache.

If, however, the possibility of fibrositis is overlooked, serious consequences to the patient may ensue. The under-mentioned case bears this out.

Case No. 14. A retired Engineer (India Railways), aged 58, began to suffer from headaches at the age of 14. These were described as severe, affecting the eyes and causing sickness and prostration. They came on at intervals sometime of three months, sometimes of six weeks and would pass off in twelve hours or so. Otherwise he was at that time fit and a more than average athletic. The start of the headache is attributed by the patient to a fall over the banisters. The headaches returned periodically during the patients 22 years of service in India, but on his return to England they began to recur at more and more frequent intervals until ten years ago when they became practically constant. For the last five years they were so bad that he could hardly walk straight. He would go to bed with the

headache perhaps not so bad, but after a short sleep would wake with severe pain in the back of the head and sleep would be fitful thereafter. The longer and sounder he slept, the more severe the headache was when he awoke. The pain was always worse on the right side of the head and in the occiput but would pass forward into the eyes with almost blinding intensity. During the attacks the patient did not know what he was doing and after they were over could not remember what had happened. His memory became greatly impaired. During the course of his illness, he had been seen by numerous specialists and eventually had been admitted to hospital with a tentative diagnosis of brain tumour. The presence of a small haemorrhage in the right fundus and an increase in the spinal fluid pressure led to his transfer to a neurosurgical hospital, and the performance of a ventriculogram. At this stage his blood pressure was 180 systolic, 110 diastolic and he was exhibiting a slow auricular fibrillation. The headache was attributed to this abnormality accentuating headache in a migrainous subject.

The patient was first seen in consultation in April 1946. At that time he was suffering from moderate headache. Intensely tender nodules were present in the sub-occipital triangle and the scalp was tender. He further admitted to a stiff neck.

An injection of procain in oil abolished the headache for two days, and a course of massage greatly improved the condition.

In August, he was seen again on account of a recurrence of intense and incapacitating headache. A tender nodule in the scalp, above the right ear was found, massage to which caused immediate relief.

The remarkable feature in the above case, is the fact that he had been seen by so many physicians and surgeons without having had any attention paid to the structures around the skull. There is little doubt that a complete cure might have been obtained if proper treatment had been made available at an earlier date.

Hyperpiesia as a cause of headache is a very common erroneous diagnosis. This is well illustrated by the following case.

Case No. 53. A married woman, aged 58, when first seen on 15th July 1946, complained of headache and feeling bad all over, of twelve months duration. The headaches were worse on the right side than the left, in the occiput and vertex, were worse in the mornings and at night, and occurred daily. They were accompanied by ringing in the ears. She slept fairly well but felt sick when she woke in the mornings. There was no history of rheumatism.

On examination she was found to be tender in both sub-occipital triangles. Her scalp was tender and she was suffering from a stiff neck. Gross enlargement of the heart was present and her blood pressure was systolic 288, diastolic 175. In view of these findings active treatment of the headache was not instituted.

On November 1946, the patient had a sudden left sided hemiphegia, heralded by a severe right sided headache. Though the headache appeared to be unaltered by jugular pressure, the significance of the situation of the head pain in relation to the hemiphegia appeared to point to the headache being in fact due to that calamity.

The headache persisted with varying intensity throughout the following month. The head was constantly held towards the right. The eyes usually closed and only opened with difficulty. A nodule in the right sub-occipital triangle was extremely tender. The hemiphegia was unaltered. At the end of this time, an injection of 5 cc 1% procain was given into the tender nodule with immediate and permanent relief of the pain. Seen three weeks later the head was not stiff and the patient used her eyes normally and without any desire to close them. The headache has not returned to date.

Treatment.

The treatment of the fibrositic headache is that of the underlying fibrositis. With successful treatment the headache clears and the concomitant symptoms clear with it.

Treatment falls under three headings:-

(1) Infiltration with procain, percain or other local anaethetic.

(2) Massage.

(3) Medication.

The acute headache frequently resolves without active treatment. Often the nodules in the occipital region are so tender as to preclude the application of massage. In such cases an injection of procain into the points of tenderness may give lasting relief. If for any reason this is thought to be inadvisable, a hot compress to the back of the neck is satisfactory. The writer usually recommends a compress wrung out in a solution of magnesium sulphate 1 oz. in half a pint of hot water, on the assumption that the anaethetic affect of the magnesium sulphate is a useful adjunct to the heat. Aspirin and compound aspirin, phenacetin caffein or Tab. Codein Co. may be given but with proper management their exhibition is usually unnecessary, nor, without effective local treatment, are they particularly efficacious.

The chronic or recurrent fibrositic headache, is not so easily amenable to local infiltration. Kelly has remarked that the more firmly established the fibrositic focus the less likely is it to respond to local injections. This the writer can bear out from his own experience. A recent focus, whether in an early sufferer or an established case, may be laid at rest by infiltration, whereas a focus of long standing is only benefitted for as long as the effect of the anaesthetic lasts.

The writer uses as a routine, 1% procain in normal saline. Two cc is usually an effective dose for any one nodule. A No. 17 hyperdermic needle is satisfactory for most cases. Prior to injection a careful search is made for the point of maximal tenderness. In this, the active co-operation of the patient is required. The needle is then passed through the skin to the deep fascia and as the deep fascia is reached, the patient will, if the needle is approaching or impinging a nodule, indicate the fact by flinching or a similar reaction. About $\frac{1}{2}$ cc of solution is then injection. A slight pause follows, during which further palpation is made around the site of the needle to detect the presence of tenderness and the remainder of the solution is then injected into four or five points within a radius of a quarter of an inch. Deeper infiltration is usually unnecessary, and should not be attempted until it is ascertained that the first testing injection has not relieved the tenderness. The injection is very painful. It usually reproduces or exacerbates the headache whilst it is being performed, but relief is so rapid that the headache is often reported to be better before the needle is removed.

Local infiltration should be used in all cases where there is doubt as to the diagnosis, and is especially useful when the headache is unilateral and appears to be activated by a single nodule. In such cases a lasting cure may be obtained by one injection as in

Yawger (1909), stated that of all forms of treatment, massage was the most effective and it still retains its prestige. To be effective however, care must be taken over its application. Massage given at home by a relative or other unskilled person is seldom satisfactory, nor can the patient, be he never so willing, properly massage his own neck. The only successful phsiotherapeutic procedure is deep friction applied with the technique described by Cyriax (1942: 1944). In brief, the massage must be directed to the painful points: it must be sufficiently robust to inflict pain during performance: in its application the deeper structures must be stimulated and to attain this the finger or thumb and the skin underlying it must move as one unit. No attempt is made to achiev vibratory movements but the finger moves backwards and forwards at the rate of about 2 - 3 times a second. The massage should be directed across the fibers of the muscle that it is desired to treat, and should not be a rotary movement. To attain the desired effect, care must be taken that the muscles to be treated are placed in a position of relaxation. Further, the position of the patient must be such as to allow of easy access by the masseuse, for the massage is tiring and, if more than one case is to be treated during a session, the strength of the masseuse must be reserved. Sometimes the optimum position may

be achieved by placing the patient in an upright chair and the operator sitting on a lower chair behind. The forehead is then supported by the palm of the left hand and the thumb or first or second fingers (whichever is desired), of the right hand used to apply the friction. Often this position does not allow ready access to the tender points. The writer finds that effective treatment may be administered with the patient lying on his side on a low couch with his head supported by a high pillow. The operator leans over the head of the patient supporting the head with the left hand and applying massage with the thumb or finger of the right hand. Cyriax (1944) prefers to have his patient prone supporting her forehead with the palm of her hands and her elbows on the couch. The position is a matter of choice and not every case can be successfully treated by one steryotyped routine.

Massage should be administered for as long as the patient can bear it. This time will vary with individual patients and will lengthen during the course of the treatment. At first perhaps one minute only will be possible; later five to ten minutes may be given without undue discomfort. In this series patients were asked to attend thrice weekly for massage: it was not unusual for a second treatment to be postponed for four days on account of the severe reaction of the first treatment. Before recommending massage, it is the writers practice to give a short

treatment himself in order to convince the patient of the benefit to be obtained and it has been found that however painful the treatment may be, patients are most conscientious in attending and this is an indication of the benefit that they obtain from it. Treatment may bring relief within a week, sometimes vigorous treatment may require to be maintained for as long as three months before complete relief is obtained. If no benefit is experienced by the patient after the first fortnight, the case should be seen by the medical attendant in consultation with the physiotherapist, when faults in technique may be searched for and remedied.

Radiant heat per se, has no beneficial effect, but administered immediately prior to the massage it may facilitate this by increasing the circulation in the part to be treated and thus render the tissues to be penetrated more fluid, and the tender nodules thus easier to approach. Protective spasm may also be lessened.

Thirtysix chronic cases of fibrositic headache were treated by massage. Of these, twenty (55%) were completely relieved of their symptoms and thirteen (36%) were greatly improved. In three (8%) treatment had no effect.

Oral medication was sparsely used and then chiefly as a placebo. Some patients found benefit from a mixture containing sodium sulphate gr x, sodium solicilate gr x and ext. colch. m ½. In those patients who appeared emotionally unstable - sod: phenobar-

bitone was exhibited during the first few weeks of treatment

Coke (1946), having observed that injections of procain appeared to give relief for a longer period than could be accounted for by the local anaesthetic effect and that many cases of fibrositis appeared to exhibit a liver deficiency, conceived the idea of combining the part of the procain molecule thought to be active against fibrositis with a bile salt and of using this by parental injection in cases of fibrositis. Coke's views are open to grave criticism. There would appear to be no grounds for supposing that procain is any more effective than other local anaethetic agents. During the course of the investigations injections of procain and percain have been given alternatively to cases of fibrositis. Fibrositic nodules in the shoulder girdle and loin have been chosen as easily identifiable and accessible. Percain (nupercain) - 1000 had a uniformally longer local anaethetic action than procain (1 - 100), the usual difference being three hours as against two hours. Lasting benefit was obtained as frequently with percain as with procain.

Seven injections of nupercain were given. Lasting benefit was obtained in five instances.

Six injections of novocaine were given. Lasting benefit was obtained in four instances.

The therapeutic action of the two substances would appear to be similar.

The clinical formulae of percain is α- butyloxyanchoninic acid diethylethylendiamide, and that of procain diethylaminoethanol hydrochloride. These substances do not appear to be sufficiently alike to account for the fact that they both, on injection, may give lasting relief if it is assumed that the benefit is obtained through chemical agency only. Copeman and Acherman have stated that benefit is obtained more frequently by teasing the nodule whilst injecting. It is far more probable that the therapeutic effect is due to mechanical rather than to clinical stimuli.

The figures produced by Coke were, never-the-less impressive. They were not supported by any satisfactory summary of the types of cases treated so that a true assessment of his results is difficult to arrive at. By courtesy of Dr. Wrigley of Roche Laboratories, the preparation used by Coke has been tried on fourteen patients, nine of whom suffered from fibrositic headache. Of these fourteen cases, seven reported improvement on completion of treatment but four of these have since relapsed. This investigation is still in progress but it would appear that an effective therapeutic agent for the cure of fibrositis is still not available.

V.

Conclusions.

There is always a danger that the common may become mundane. The tendancy in medicine today is to seek for the rarities. Increasing specialisation is leading to a more intimate knowledge of the more detailed and obscure aspects of physiology and pathology with a great increase in our sum total of knowledge at the expense of our sense of perspective. The subject of this essay has suffered in this way. The word headache vies with the ubiquituous bottleneck in the fashionable journalese of the day so that even Governments and other inanimate bodies may be inflicted by the complaint. It is everywhere uncritically accepted that hard or unwonted mental exertion will cause a headache, as inevitably indeed as it is held that the absent lover will experience heartache. If asked, the man in the street would undoubtedly assert, that the forms of H.M. Commissioners of Inland Revenue are by far the commonest cause of cephalalgia. It is not surprising therefore, that the subject has received so little attention of recent years.

The analysis of cases here reported, revealing as it does a proportional incidence of causation entirely contrary to current teaching, is an example of the way in which advances in the knowledge of phsiology and experimental pathology may outstrip clinical experience. Arising out of this

investigation is the recognition of a syndrome, of headache with either tinnitus, vertigo, nausea or vomiting ~~un~~associated with fibrositic nodules in the sub-occipital region which is common and easily amenable to treatment. This syndrome has not previously been subjected to analytical study; yet it has been experimentally produced in human beings (vide Campbell and Parsons). It has further been shown that this fibrositic headache is the commonest variety of headache, and reasons have been adduced to show that this frequently might be expected.

As previously stated, the writer has excluded the headache associated with febrile illness. During the course of this investigation many cases of fever associated with headache have been seen. The headache of influenza is undoubtedly due to a myalgia of the sub-occipital muscles which are tender, as are the muscles and ligaments of the back and the distribution of the headache is due to the pain pattern of the affected part. One case of malaria with intense headache exhibited the same occipital tenderness. In these cases pressure on the jugular veins does not affect the severity of the headache and alterations in the cerebral pressure, may therefore be excluded as a cause of the pain.

With the advent of synthetic chemotherapeutic agents and the increase in our knowledge of the deficiency diseases and endocrine

disorders the period of disability and consequent suffering caused by the more severe incapacitating diseases is rapidly diminishing, and yet the incidence of minor illness is increasing. (Monthly Bulletin of Ministry of Health, January 1947, page 4.)

In this thesis an attempt has been made to clarify our knowledge of one of the commonest causes of minor illness.

Summary.

(1) The present state of our knowledge with regard to the mechanism of head pain has been critically reviewed.

(2) The incidence of the symptom headache amongst the general population has been investigated. By far the largest number of cases fall into the group of fibrositic or rheumatic headache, 87% of this series. Eye strain and psychoneurosis are relatively uncommon causes of head pain.

(3) The fibrositic headache has been investigated and the symptomology described in detail from the examination of the notes of one hundred cases.

(4) What is believed to be a previously unrecognised cause of tinnitus has been described.

(5) Other concomitant symptoms, giddiness, nausea and vomiting and psychopathic manifestations have been discussed.

(6) The importance of an early and correct diagnosis is stressed.

(7) The treatment of the condition is discussed.

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Name Age

Address Date

Complaint :-

(1)

(2)

(3)

Duration (1) (2) (3)

Site of headache

Frontal. — temporal — vertex — occiput.

Bilateral — unilateral.

Worse in mornings — evenings ?

Continuous — intermittant.

Duration of attacks

Effect of weather.

Head noises — ringing in the ears

Associated symptoms :-

Anxiety — depression

Insomnia — early or late

Nausea or vomiting

Head Injury ?

Examination.

Tenderness of occipital ridges — scalp

Stiffness of neck

Disease of ear, nose, throat.

History of rheumatism

Special examinations

Urine

B.S.R.

Diagnosis

Serial Number

Treatment.

Massage — at home — Masseuse

Injection.

Outcome.

Additional notes :-

APPENDIX 1.

APPENDIX 2.

SUMMARY OF CASES OF RHEUMATIC FIBROSITIS.

The following table is a summary of the salient features of the cases on which the analysis in part IV of the thesis is based.

The serial numbers correspond with the numbers to be found in the text against those cases more fully quoted there. The numbers not included refer to cases of headache from causes other than fibrositis.

APPENDIX II

Serial No	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather.	Nausea or Vomiting.	Head Noises.	History of rheumatism.	Remarks.
1	F	40	Headache	6	F + O Bilat	None	No	No	Yes	Improved by massage
3	F	52	Headache & sickness	2	F.T.V. unilat:	None	Yes	Yes	Yes	Cured by massage Case reported p.50
4	F	56	Headache	5	O.V.F. Bilat:	None	No	Yes	Yes	Cured by massage
6	F	23	Headache	5	F Bilat:	None	No	No	No	Pregnant. No severe headache during pregnancy. Not treated.
7	F	26	Loss of weight & lassitude. Headache.	1	F.V.O Bilat:	None	No	Yes	Yes	A case of fibrositis with psycogenic symptoms. Improved by massage.
9	F	19	Headache	4/12	F + T V.O. unilat:	None	No	Yes	- No	Immediate improvement with massage at time of first interview. A second attack cured by injection of 2 cc procain.

F - Frontal T - Temporal V - Vertex O - Occiput.

Serial No	Sex.	Age.	Major Complaint.	Duration in years	Site of headache, bilat: or unilat:	Effect of weather.	Nausea or vomiting.	Head Noises.	History of rheumatism	Remarks.
10	M	33	Headache Pain in elbow. (Old g.s.w.)	5	F.O. bilat:	None	No	Yes	No	A post-traumatic headache. Much improved by massage.
11	F	52	Ringing in head. Neuritis in arm.	10	F.O. bilat:	Damp	No	Yes	Yes	Generalised fibrositis Improved by massage.
13	F	63	Giddy headache	1/52	F.V. + O bilat:	Wet	No	Yes	Yes	Improved with massage at home. Only seen 3 times.
14	M	58	Headache	38	F.O.V.	None	Yes	No	No	Case reported p.57
15	M	23	Headache	4	F.T.	None	Yes	Yes	No	Case reported p.53
16	M	22	Backache. Headache	6/12	O.V.F.	None	No	Yes	Yes	Generalised fibrositis. Improved by treatment at home.
17	F	22	Cold in head Headache.	9/12	F	None	No	Yes	Yes	Massage of nodules at first interview relieve Did not thereafter complain or attend for headache.

Serial No.	Sex.	Age	Major Complaint.	Duration in years.	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting.	Head Noises.	History of rheumatism.	Remarks.
18	M	22	Stiff neck. Continuous headache.	2/365	V.O.	-	No	No	No	Described as a funny feeling like the skin being drawn tight over the head. Cured by massage in 14 days.
19	F	43	Weakness & loss of energy. Headache.	6/52 1	F +.O Bilat:	None	No	No	No	Blood count R.b.c.3,760,000. W.b.c.16,000 Hb. 527 A microcytes hyperchromia anaemia who responded well to Ferri et Ammon. Cit. Headache treated by massage. Tenderness over occipital ridges marked. Rt side worse than left. Cutaneous tenderness present. The headaches were internittent and recurrent. Cured.
20	F	15	Pain in eyes Headache. Pain in stomach and back.	2 2 1/52	F +.T Bilat:	None	No	No	Yes	Treated by massage. Five months later no recurrence.
21	F	61	Headache Listless & easily tired.	1	O unilat:	None	No	No	Yes	Recommended massage. Did not attend for domestic reasons.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism.	Remarks.
22	M	24	Tiredness Headaches	1/12	F. Bilat:	None	No	Yes	No	Immediate improvement on massage to the occiput.
24	M	46	Terrible heads	5/52	T.O. Bilat:	None	No	Yes	No	Cured by massage at home in one month.
25	M	71	Pain behind ear	4/365	O. unilat:	-	No	No	No	Similar attack 10 yrs ago. Cured by treatments of massage.
26	F	34	Dizziness. Full feeling in head.	6/52	V.O. Bilat:	None	No	Yes	Yes	B.P. 120 systolic, 80 diastolic. Tender over occipital ridges. Scalp tenderness present.
27	F	57	Aching all over. Headache	3/365 10	O. Bilat:	Wet	Yes	Yes	Yes	Lumbar fibrositis also present.
28	M	43	Catarrh Headache	7 7	O. Bilat:	None	No	Yes	Yes	Scalp wound 1940. Complained of giddy spells. Fibrositis in arm in site of old wound when the weather changes.

Serial No	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises.	History of rheumatism	Remarks.
29	F	64	Headache Rheumatic pain in knees	20 + 5	O. Bilat:	Damp	Yes	No	Yes	Headaches improved by massage at home.
32	F	27	Nasal catarrh. Headache Low backache	12hrs	F. Bilat	Wet	No	No	Yes	A previous similar attack 1 year before was diagnosed as fibrositis.
33	F	72	Bilious Pain in head	2/12	V.O. unilat:	None	Yes	No	Yes	Cured by 1/12 massage.
34	F	36	Headache	2/365	F. unilat:	Wet	No	No	No	Immediate relief by massage to head.
35	F	58	Headache	4/365	F. Bilat:	Wet	No	No	Yes	Arthritis of the rheumatic type present. Lt. occipital ridge tender and scalp. Seen only once.
36	F	20	Nerves on edge. Headache	2/52 1	F. Bilat:	Wet	No	No	No	Occipital ridges tender; scalp tender. A Bus Conductress, very emotional Course of massage completely relieved.

Serial No.	Sex.	Age.	Major Complaint	Duration in years.	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises.	History of rheumatism.	Remarks.
37	F	27	Bilious attack. Frequent headaches	12	F. Bilat:	None	Yes	No	No	Seen only once. Very tender over sub-occipital nodules. No scalp tenderness.
38	F	42	Tired & irritable. Headache. Backache.	1/12 10 + 16	F.T + Bilat:	Thunder	No	No	Yes	Very tender over occipit ridges. Has not had course of treatment.
39	F	54	Amenorrhea. Headaches with period.	1/52 40	T.V. unilat:	None	Yes	No	No	She states - "it is not a real ache but the side of the head is sore". Lt occipital ridge is tender and it hurts wher she combs her hair. Menopausal headache present but period not.
40	F	47	Pain in lt shoulder. Hot flushes. Headache.	2/52 1 1	F + U Bilat:	None	No	Yes	No	B.P. 156 systolic. 100 diastolic. Treated by massage. No headache since commencing treatment. Occipital ridges very tender. Hexoestrol given for menopausal symptoms.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism	Remarks.
41	F	68	Headache. Weakness & aching all over	3/52 1/12	O. + B.F. Bilat:	None	No	No	No	The headache in this case followed an attack of rheumatism with shooting pains in the joints, especially the hip joints.
42	F	36	Nerves on edge and aching all over. Headaches	6/12 6/12	F.T. Bilat:	None	No	No	No	Case reported p. 54
43	F	21	Headache. Herpes Zoster.	2 2/52	T.O. Bilat:	None	No	No	Yes	Apparently dates from a cycle accident after which she was semi-conscious. Headaches were worse with periods. Herpes zoster of 1 - 2 cervical roots has had no effect on the headache.
45	F	52	Headache	3/365	O. Unilat:	-	No	No	Yes	Maximal tenderness as the level of 4-5 Nodules palpable rt side. 6 weeks later developed fibrositis of scapula region. Treated with -novocain with relief.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism.	Remarks.
46	F	40	Pain in temples	6/12	T. Bilat:	None	No	No	No	Blood pressure. 164 systolic, 100 diastolic. Greatly improved with massage. Depression with tendancy to weep, marked. General mental condition also impaired.
47	F	55	Headache. Dysuria. Backache.	40 1 6/12	F.T. unilat:	None	Yes N	No	Yes	This patient showed a remarkable improvement with massage and stated after 6 wks treatment, that the headaches were practically cured.
49	F	32	Nausea & gastric upset. Headache.	1/52 6/12	F. Bilat:	None	No	No	Yes	Nodules in this were easily felt. Not treated.
50	F	30	Headache. Sore throat	3/365	O.V.F. Bilat:	-	Yes V.	No	No	Immediate relief of headache with one application of massage.
51	F	88	Headache. Sickness	2/12	F.O. Bilat:	None	Yes	No	Yes	An osteoarthritic, bedridden Patient experienced immediate benefit from massage to the tender points.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism.	Remarks.
52	F	31	"Run down" Headache	6/365 3/365	F.O. Bilat:	None	Yes N	No	Yes	"Neuritis" of arms. Massage to occiput immediately relieved headache.
53	F	58	Headache Bad all over	1 1	F.O. Bilat:	None	Yes	Yes	No	Case reported p. 59.
54	F	46	Headache	1/52	F. Bilat:	Yes	No	No	Yes	Relieved by massage and hot packs to occiput. This patient was under treatment for menopausal pruritis of the vulva.
55	M	37	Headache. Cold in the head.	7/365 10/365	O + F Bilat:	-	No	No	Yes	In spite of nasal catarrh there was no tenderness over the frontal sinuses but marked tenderness over the sub-occipital area.
56	F	81	Headache Pain in the shoulder	30	O. Bilat:	None	Yes	Yes	Yes	Case reported p. 55.
58	F	17	Headache Buzzing in the head.	7/12 1/52	F.T. unilat:	None	No	Yes	No	Immediate relief of headache & buzzing in the head by massage.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache, bilat: or unilat:	Effect of weather	Nausea or vomiting	Head Noises	History of rheumatism	Remarks.
59	F	46	Headache Backache	10 7	F.V.O. Bilat:	None	Yes N	No	Yes	Suffusion of conjunctiv present. Headache eased by each massage treatme
60	M	70	Headache Pain in back & knee	2/12 6	F.O. Bilat:	Yes	No	Yes	Yes	Extensive osteoarthriti with concomitant fibros present. Patient compla also of earache. Massag to the tender nodules relieved.
61	F	39	Headache. Neuritis of shoulder	20 10/365	F.T.O. Bilat:	None	No	No	Yes	Depressed individual. Headaches immediately relieved by massage. Recurred 6 mths later.
62	F	38	Backaches. Headaches.	5 5	O.+ T. Bilat:	Thunder	Yes V.	No	Yes	Was found to have splenomagally. Blood co and spinal puncture revealed no definite abnormality.
64	F	74	Throbbing pain in head. Giddiness Aching pain in the ear.	3 3 3	T. Bilat:	Thunder	No	Yes	Yes	Relieved by massage. 6 months later had severe fibrositis of th rt. chest wall.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism	Remarks.
65	F	64	Giddy Headache	1 3	F.T. unilat:	Thunder	No	No	Yes	B.P. 230 systolic 130 diastolic. Tender over both occipital ridges. Scalp tender.
67	F	32	Headache	7	F.T.U. Bilat:	None	Yes N	No	Yes	Under treatment for pulmonary tuberculosis. Headaches always worse with periods. Previously diagnosed as megrain. Massage at home relieved
68	F	65	Sleeplessness Giddiness Headache.	10/12 2/52 2/52	F.V. Bilat:	Change	No	No	Yes	B.P. 180 systolic, 98 diastolic. Massage at home improved headache.
69	M	26	Headache Hot & cold turns.	5 1/365	F.T. unilat:	None	No	No	No	Case reported p. 53
70	F	49	Headache	35	F.T.R. Bilat:	None	No	No	Yes	Chronic generalised fibrositis. Rt. side very much worse than lt. Associated when first seen with oedema of rt lower eyelid.

Serial No	Sex.	Age.	Major Complaint.	Duration in years	Site of headache. Bilat: or unilat:	Effect of Weather	Nausea or Vomiting	Head Noises	History of rheumatism	Remarks.
71	F	80	Headache Breathlessness	3/52 3	F.T. Bilat:	None	Yes N	No	No	Headache relieved by one application of massage. 4 mths later developed fibrositis of shoulder. Under treatment for hyperpiesia.
72	F	42	Dizzy pains in head	2/12	F.V. Bilat:	Thunder	No	Yes	Yes	Hb. 60%. Massage relieved ache. As Hb level increased headache disappeared as also did "rheumaticy" pains of the limbs.
73	F	51	Headache. "Shock"	6/12	F.V.O. Bilat:	None	No	Yes	Yes	Consultation after having had house burnt out. Improved with massage at home.
74	F	60	Headaches. Tired & run down.	2 3/52	V. Bilat:	None	No	Yes	Yes	B.P. 140 systolic. 90 diastolic. Very tender nodules on vertex of scalp & massage to this relieved the pain.
75	M	40	Headache. Backache	5 5	F.T.V.O. Bilat:	None	No	No	Yes	Lumbago. This man was invalided from the Services as "psychoneurosic" & the diagnosis later changed to osteoarthritis. Treated with injections into tender nodules. Immediate relief - obtained but not maintained for longer than the time of anaesthesia.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of Rheumatism	Remarks.
75A	F	35	Headache Rheumatism	6 10	O.V. Bilat:	Damp	No	No	Yes	This patient's headaches were very severe. Seen when unable to rise from bed on account of the pain. After adequate massage the pain was abolished.
76	F	38	Headache	3/12	F.V. Bilat:	None	No	No	No	This headache was attributed to the eyesight. Opthelmologist reported no opthelmic cause. Great improvement in headache and visual acuity after massage.
77	F	16	Headache Cold	3/365 1/52	F. Bilat:	-	No	No	No	This headache was secondary to the coryza. Was relieved at once by massage.
78	F	40	Headache with periods	1	F.O. Bilat:	Thunder	Yes	No	Yes	This patient complained also of a creeping feeling over the head and stated that excitement or worry made the headache worse. Jugular compression has no effect on the headache.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of Rheumatism	Remarks.
79	M	51	Cough & cold Headache	1/52 30	F. Bilat:	None	No	No	Yes	Case reported p.54.
80	F	67	Breathlessness Headache	9/12 1	F. Bilat:	None	No	No	Yes	B.P. 210 systolic, 110 diastolic. This patient stated she had relief with jugular compression but she was very tender over the occipital ridges and massage to these points relieved the headaches. 5 mths later she had a cerebral haemorrhage. Headache was not a feature.
81	F	40	General lassitude. Headache Rheumatism.	2/12 5 1	F.+ O. Bilat:	Wet	No	No	Yes	Headaches became much worse after concussion 3 yrs before. Cured by massage & general condition much improved.
82	F	36	Headache	1	O. Bilat:	Wet	No	No	Yes	Headaches very much improved by massage but later relapsed.

Serial No.	Sex.	Age.	Major Complaint	Duration in years	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises.	History of rheumatism.	Remarks.
83	F	40	Pain in lt. chest. Headache.	3/12 7/12	F. Bilat:	None	Yes	Yes	Yes	Improved with treatment at home.
84	M	60	Headache. Collapse at work. Bronchitis.	3/12 2/365	F. Bilat:	None	Yes	Yes	Yes	The headache had been present for 3 mths. There was intense tenderness over the occipital ridges. This headache was interesting in that it was worse af coughing & that it was relieved by jugular compression, i.e. there was present both an occipital fibrositis and a toxic headache.
85	F	47	Headache Lassitude & pain in chest	30 2/52	F. Bilat:	Heavy days	No	No	Yes	The nodules in this case were easily palpable. Fibrositis of chest wall also present. After very intense massage the head ache was stated not to h improved although exacerbations were not s frequent.

Serial No.	Sex.	Age.	Major Complaint.	Duration in years.	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism.	Remarks.
86	F	26	Palpitation. Headache	1 2	F.+ O. Bilat:	None	Yes	No	No	This patient did not attend for massage. Seen 5/12 later headaches still present.
87	F	15	Pains in side. Headache	1/52 7	F.O. Bilat:	Wet	No	Yes	Yes	Fibrositis of chest wall. 2 mths later, fibrositis of abdominal wall. Headaches cured by massage.
88	F	26	Headaches Mist in front of eyes.	3/12 3/12	F.T. Bilat:	None	No	No	Yes	Eyes - no opthalmic cause. Improved with massage but not cured.
89	F	32	Pains in side Pain in head	2/12 1	F.O. Bilat:	None	No	Yes	Yes	Hb. 88%. A chain of nodules were palpable from the occiput to scapular region.
90	F	23	Headache	5	F.V. Bilat:	None	No	Yes	Yes	Not followed up.
91	F	51	Pain in chest Headache.	15/12 2/12	F.T.O. Bilat:	None	No	Yes	Yes	B.P. 160 systolic. 100 diastolic. Lower border of liver was palpable & she complained of flatulence. Cholcystectmy was performed for cholelithiasis. The fibrositis recurred after the operation.

Serial No.	Sex.	Age.	Major Complaint.	Duration in years	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of Rheumatism.	Remarks.
92	M	9	Headache	1/52	F. Bilat:	None	No	No	No	Tender nodules present in occiput. This headache was the sequel to a cold.
93	F	40	Headache & neuralgia	2/365	F.T. Unilat:	None	No	Yes	No	Three similar attacks in 7 - 8 years. Sharp shooting pains were brought on by movement of the head and by swallowing. This cas was treated solely by injections with entirely successful results.
94	F	37	Backache Abdominal pain. Headache.	2 2/365 25+	F.O. Bilat:	Winds	No	Yes	Yes	A generalised fibrositis: when first seen a tender nodule of the abdominal wall was simulating appendicitis. Relief of both pains was instantaneous on the administration of deep massage. Has been seen with several acute headaches which have been instantly relieved by injection.
95	F	59	Headache. Giddiness.	18/12 18/12	F.T.O. Bilat:	None	Yes	No	Yes	Definite tender nodules present. An unsatisfactory patient on account of low mental condition.

Serial No.	Sex.	Age.	Major Complaint	Duration in years.	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises.	History of rheumatism.	Remarks.
96	F	52	Nausea Headache	1/365 2/365	F. Bilat:	-	Yes	No	No	Associated with a stiff neck. Spontaneous recovery without relapse. Colloid cystic goitre present.
97	F	50	Abdominal pain. Headache	2 35	F. Bilat:	None	Yes	No	Yes	Vertigo also present. Not treated by massage.
98	F	36	Headache Tiredness. Aching legs.	1/52 3/12 1/52	V.+ O. Bilat:	None	No	No	No	Immediate improvement with massage in surgery.
100	M	54	Cough Headache	2/52 2/52	F. Bilat:	None	Yes	Yes	Yes	Compression of jugular vein no difference. Worse during the act of coughing & painful on flexion of head against pressure. Previous similar attack one year ago. Massage and injections eventually cured. A case in which the act of coughing set up the pain.
101	F	7½	Headache	1/365	F. Bilat:	-	No	No	No	Rt. occipital nodule very painful.

Serial No.	Sex.	Age.	Major Complaint.	Duration in years.	Site of headache. Bilat: or unilat:	Effect of weather	Nausea or Vomiting	Head Noises	History of rheumatism.	Remarks.
102	M	4½	Headache	2/52	V.O. Bilat:	-	No	-	No	Both occipital ridges tender & occipital region of scalp tender to touch. Headache was sequel to an acute febrile attack with mild inflamation of the tonsils, two weeks previously.
103	F	35	Clots with periods. Headache	3/12	F.O. + Bilat:	Heavy weather	No	No	No	Improved with massage at home.
104	M	57	Headache Aching in joints.	3/12 2/365	F.T. Bilat:	None	No	Yes	Yes	Cured by massage.
105	F	23	Styes Headaches	6/12 6/12	F. Bilat:	None	No	No	No	The headaches were associated with the styes in that they always came on with them, yet the headache was at once relieved by massage to the tender nodule in the occiput.
106	F	47	Headaches	2/12	F.T. Bilat:	None	No	Yes	No	Patient states she has always been "bad in the head & that the headaches come on worse after periods". Massage to the tender nodules, at once relieved the headache.

Serial No.	Sex.	Age.	Major Complaint.	Duration in years	Site of headache. Bilat: unilat:	Effect of weather	Nausea or Vomiting	Head Noises.	History of rheumatism.	Remarks.
107	F.	20	Giddified. Vomiting. Headache.	1/365	F. Bilat:	-	Yes	No	No	Case reported p. 51.
108	F	69	Headaches	2/12	F.O. Bilat:	None	No	No	Yes	Rheumatism of shoulders. Giddiness. Fell & knocked back of head 21 mths ago. Clear of headaches after course of massage.
109	F	70	Pains in head. Giddiness.	5/365	F.T.V.O. Bilat:	None	No	No	No	Case reported p. 51.
110	F	29	Asthma Headache	17 8	F.T.O. Unilat:	None	Yes	No	Yes	Has not since complained.
111	F	21	Headache	2/52	F.T. Unilat:	Cold	No	No	No	Sometimes has headaches before periods.
112	M	36	Headache Cold and cough.	3/365 12/365	F. Bilat:	-	No	No	No	Headache sequel to coryza.